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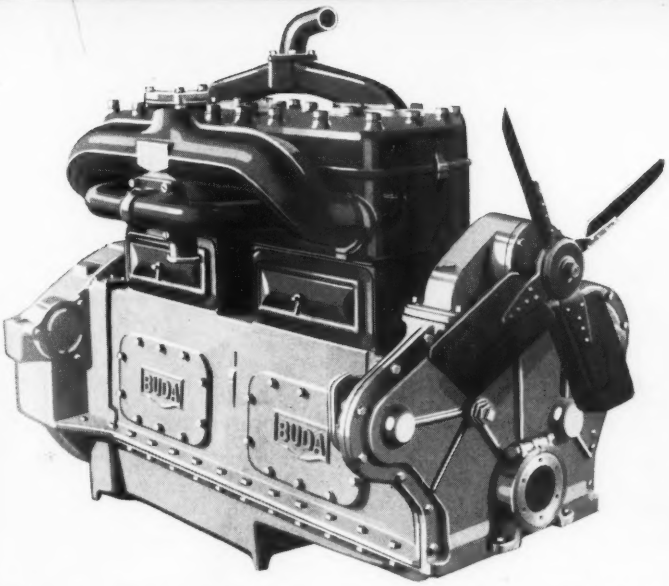

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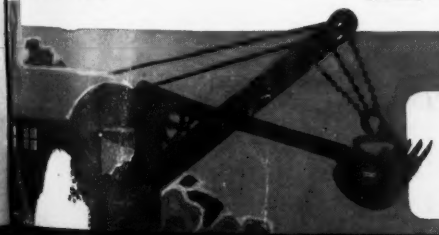

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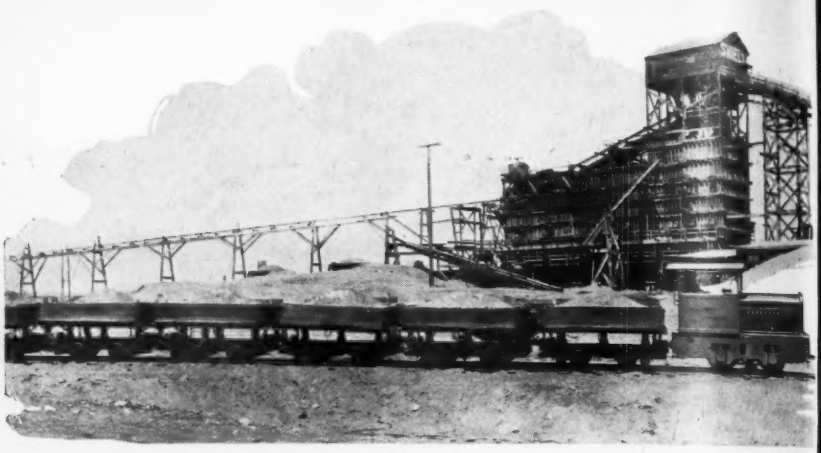

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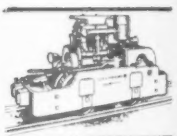

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A Semi-Monthly Publication for Producers and Manufacturers of Sand, Gravel, Stone, Cement, Gypsum, Lime and Other Non-Metallic Minerals.

VOL. 9 CHICAGO, ILL., FEBRUARY 15, 1925 NO. 10

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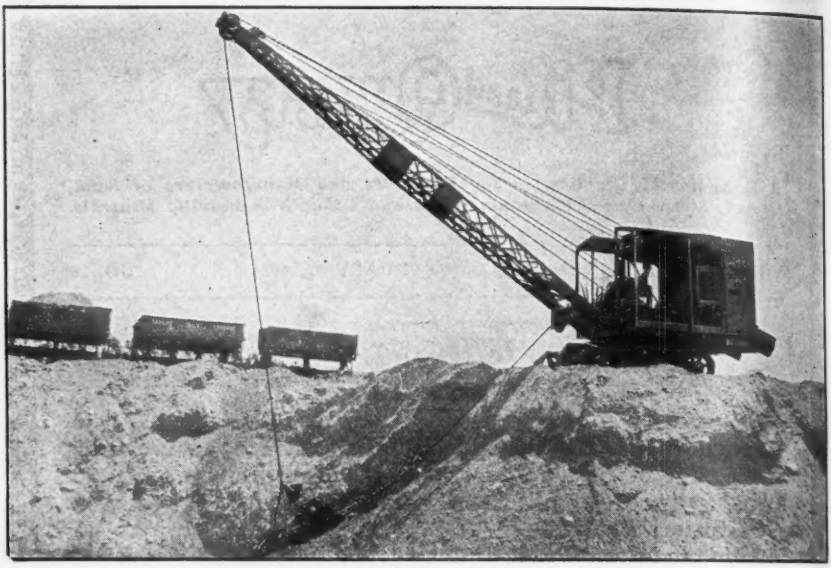

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Pit and Quarry

Vol. 9 Chicago, Ill., February 15, 1925 No. 10

The Personnel Publication

MANY executives now realize that the personnel publication is of tremendous importance in the organization. It is a powerful factor in creating mutual trust and cooperation, in maintaining harmony and in breaking down barriers between the workers and the management. No other agency could so thoroughly represent all of the members of the organization. The employees' paper is of, by, and for them all, and its powers are great. There is no industry in which it cannot function effectually for increased harmony, loyalty and efficiency. All men like to be represented, to feel that they are a recognized part of the great organization which they serve. The plant is a little community with thriving human interests. Man is gregarious; he loves the group of which he is a part. That group instinct is stimulated when he learns what his fellow workers are doing, when he reads a paper which is distinctly and entirely pertinent to him and his comrades.

The content of the personnel publication may be varied and valuable. There is every opportunity for growth in its range of material. Of course, the first hold on the readers will come through that which touches them personally. There is nothing just like the thrill that a man gets the first time he sees his name in print. Where human beings are working together day after day, year after year, they become a social group. If Bill Jones is sick or Sam Smith has moved, everybody gets some satisfaction out of the news item which announces the fact. Sam likes to read about Bill because Sam knows that some day a news item will appear about him for Bill to read. We are all egoists; we like a little of the limelight.

There is a good chance in the personnel publication to spread information regarding the company's policies, its standards, and its aims. An enlightened group of employees will produce better results than one which works in the dark. If a new machine has been installed, a new unit opened, or a different method put into force, the matter can be explained clearly and thoroughly so that everyone is informed and consequently interested. Countless rumors are likely to be circulating among employees, sometimes causing uneasiness and hence interfering with the work. The clear printed statement will clarify the situation and prove valuable. Perhaps a new foreman appears on the job and everybody wonders who he is and why he is there instead of some one else whom they have in mind. A write-up of the new man with the facts in the case that should be given out will introduce him to the force. The way will be cleared for his activities with the result that friction will be avoided. The authentic statement printed in the employees' paper ends all conjecture regarding matters that may seem mysterious and ominous when discussed in the manner of hearsay.

Another opportunity for the publication to serve the management is in its appeal to the loyalty of the employees. Suggestions coming to them through this medium are far reaching. A spirit of pride in their own plant, in the product they put out, may be stimulated in this way. The man whose work is concerned with the one operation which he performs may never know what the finished product is. He knows one machine, or he watches a shovel perform its task, and further than that he is unconcerned. If he knew that miles and miles of highways were the ultimate result of his labor, that great bridges span our innumerable rivers because he works his steam shovel, that the sky scrapers of our cities are made possible because of him and his fellow laborers, he would catch a glimpse of the great industrial scheme

of which he is a part. He learns through his paper that his company's product is considered unique in some way, is superior perhaps to others, and he is inspired with pride and loyalty.

The personnel publication may be of service to the employee in its educative features. Simple, practical knowledge of value to the more ignorant worker can easily be given space in the paper. For the more fortunate employee there may be provided technical information pertinent to the particular industry. An enterprising editor of such a paper has unlimited opportunity to extend this part of his work. He can make use of all of the ability of his staff. One member may be especially fitted for handling some phase of this educative work and will himself be benefited by the effort which he puts into it. He is a specialist in electricity and can write a series of articles on motors. Another has made a study of safety devices and can give his fellow workmen the benefit of his knowledge. The paper which furnishes a liberal education of that sort to the workers will have an ever increasing influence. Such a paper will be read while the laborer eats his lunch, discussed as he rides to and from his work, and valued as an authority when he proudly refers to it.

This personnel publication will find its way into the homes; it will reach out to the families of the workmen. It can bring to the wife and mother practical suggestions in home economics. It can furnish much needed information on such subjects as health, thrift, home owning, investments, insurance. It can offer suggestions for the use of leisure time thus affecting entire families. It can sell the company to the homes, thus winning a strong foundation of good will. Since the staff comes from the employees, and the readers are employees and their families, there is a strong economic band holding the group together. Such a harmony of interests has a practical effect on the business.

Of what value is all of this to the owners and the stockholders? The answer is evident. A harmonious working body produces more effectively than one where there is discord. An interested and enthusiastic group accomplishes more than an indifferent and apathetic one. An informed and intelligent worker is worth more than an ignorant, stupid one. The employee whose home conditions are satisfactory works better than the one who spends his leisure time in unpleasant surroundings. No estimate can be made of the value of loyalty. Of course, the personnel paper cannot attain all of these things at once. It is not a miracle worker. It can, however, contribute to the upbuilding of a fine spirit among the workers. Its field is large. Its influence will increase with its growth until it will become indispensable from the standpoint of its practical value. What may sound altruistic and idealistic will turn out to be a factor in the organization that is measured in terms of cold cash.

Compensation for Good Ideas

It is possible for every industrial establishment to build up and maintain a better organization. Large manufacturing companies and railroad corporations have for some years found it profitable practice to compensate their corporate officers and employees for suggestions and original ideas for eliminating waste. Any employee that can produce ways and means of increasing economy and thus of attaining greater efficiency in operation is, of course, valuable to his employer.

This practice of compensating employees for valuable ideas is to be commended. It puts the employee on his mettle and makes him alert and keenly interested in the welfare of the business. Compensation has taken various forms. In some cases a bonus has been paid; in others profit sharing method is preferred, and in still others promotion is granted to employes who have proved themselves to be valuable in this way.

There is no reason why smaller organizations should not follow the example set by larger corporations. It would undoubtedly prove profitable to an operator in the stone, sand, and gravel business even if his plant were small. He might well consider the advisability of beginning such a practice now that a new season is about to open and the year's profit lies before him.

1925—Another Five Billion Dollar Building Year

PERHAPS the most interesting statistical development in the building field during the past few years has been the Annual Building Survey and Forecast by The Architectural Forum. For the past three years, since the institution of this annual forecast, the Forum prediction as made the first of each year, has been within 3 per cent correct when compared with actual figures at the end of the year. This forecast of building activity is based on a comprehensive survey carried out through individual reports from a large number of architects and from building contractors, bankers and others directly interested in the construction field. The investigation is made in 19 building types and covers each state. Percentage comparisons are made with the previous year in each classification, so that there is provided not only a definite measure of activity in each district, but a relative measure of the increase or decrease of public interest in the particular building type in question.

The accompanying tabulation represents in detail the Fourth Annual Survey and Forecast of The Architectural Forum, which indicates for 1925 another $5,000,000,000 building year, the actual figure determined by the survey being $4,992,318,000.

This survey was conducted in exactly the same manner as that used successfully for the past three years during which period the Forecast of the Architectural Forum presented at the first of each year, has closely approximated the actual totals of the year. In January, 1924, the published forecast of The Architectural Forum predicted an expenditure of $5,560,367,700 during that year. Figures now available prove that this prediction was correct within 3 per cent. A recent statement by S. W. Straus & Co. is as follows:

"The year 1924 has been the largest building year in the history of the country in point of financial requirements. Last year the volume was $5,500 000,000, but aggregate operations this year exceed the 1923 total by about 4½ per cent."

A recent statement by the F. W. Dodge Corporation is as follows:

"1924 was another record-breaking building year. Total contracts awarded during the year in the 36 eastern states (which include about seven-eighths of the total construction volume of the country) amounted to $4,481,807,000, indicating that the total volume for the entire country was well over $5,000,000,000."

Thus, reports from dependable sources indicate that The Forum Forecast for 1924 was correct and the statement made last January, that "there will be a late reaction in the fall of 1924, providing during the year two peaks of building activity totaling more than $5,000,000,000 for the year," has been changed from a forecast to a fact.

Factors Influencing 1925 Building

All evidence would seem to bear out this prediction that 1925 is to be another record building year and that the great momentum of the building industry would continue almost unchecked. The basic elements which establish the total volume of building in any given year include the following:

An established shortage of buildings
Public confidence in the building situation
Stabilized costs
Good transportation conditions
Ample mortgage money
Good labor conditions
Well maintained rentals
Sound general business conditions

Of course, in certain districts the building shortage has to a considerable extent been met but at present building costs, the normal expenditure required in this country is approximately three and a half billion dollars, so that even at the five billion dollar rate, it will still take several years of more than normal activity to meet the requirements of the shortage which accumulated over the period from 1913 to 1920.

There has occurred no abrupt rise in building costs or no trouble in the labor situation to disturb public confidence in building. In fact, conditions today are better than they were a year ago, for we have behind us a year remarkably free from labor disturbances and one in which building

Percentage of Public Demand for New Buildings—A Comparison Between the Years 1924 and 1925

The figures shown below are percentages indicated for various building types and geographical localities. The percentages are those from the Architectural Forum Building Forecast for 1924 and for 1925. Each indicates the relative proportion of the total amount of prospective building represented by the specific building type. Percentages for the two years are presented together in each division so that the variation of interest in each type and district may be clearly shown.

Comparative Activity in Various Building Types During 1925

To demonstrate the use of this table we may take for instance the situation of bank building in the Northeastern States for 1925 as compared to 1924. In the chart the figures show that bank building in the forecast for 1924 in the Northeastern States represented 6 9% of total prospective building for that district In 1925 bank building represents only 1.6% of the total forecast for the district. This comparison indicates that there will be much less bank building in the Northeastern States during 1925 than in 1924. On the other hand the office building situation in this district evidences twice as much activity in 1925. Similarly comparisons may be made for the 19 building types in 6 geographical divisions of the country.

Type of Building	Northeastern States		North Atlantic States		Southeastern States		Southwestern States		Middle States		Western States		United States	
	1924 %	1925 %	1924 %	1925 %	1924 %	1925 %	1924 %	1925 %	1924 %	1925 %	1924 %	1925 %	1924 %	1925 %
AUTOMOTIVE	4 4	3 2	3 1	2 .	1.8	2.	2.	2 8	2 4	3 3	1 8	4.	2 6	2 9
BANKS	6 9	1 6	4 9	4.4	3.2	3.4	1 8	4 4	3 1	2 9	2	2 6	3.7	3.3
APARTMENTS	8 1	9.5	12 7	15.6	8.2	10 6	6	9 1	8.	10.1	16	6 6	9.8	10 2
APARTMENT HOTELS	7.2	3.6	6 3	3.8	2.1.	4 1	1.	4 7	8.6	4.6	5	3.4	.5.	4.
CLUB AND FRATERNAL	5 4	7.4	4.4	5.9	6.1	4 1	6.	4.3	6.8	7.5	4 9·	6 5	5.6	6
COMMUNITY AND MEMORIAL	.7	1.7	1.6	1.3	.7	.4	2.2	1.1	.9	.9	2 8	1.6	1.5	1 2
CHURCHES	5.1	5.4	4 8	5 9	6.9	9.4	7.	11.9	4.8	9.2	5.9	6.3	5.8	8.
DWELLINGS (under $20,000)	4 2	3.8	6.3	6.	3.8	6	4.2	3.8	2.7	3.9	3.2	3 6	4 1	4.5
DWELLINGS ($20,000 to $50,000)	2 7	2.2	3.	2.1	2.4	3.6	2.5	1.7	1.4	1.9	1 2	1 9	2.2	2.2
DWELLINGS (above $50,000)	2 6	1.1	1.8	1.3	.9	.9	1.9	1 4	.8	9	1.3	1 2	1.6	1.1
HOTELS	6.1	8.1	9 5	5.4	23 6	17.6	15.9	6.	11.8	10	11	8.	13.	9.2
HOSPITALS	3.4	3.3	5.7	4.9	3.4	2 8	6.9	5 6	6.2	3.9	4 6	6.7	5.	4.5
INDUSTRIAL	8.2	9.1	10 1	6.3	4.7	4.	2.8	4.4	7.7	11	4 7	6.3	6.5	6.9
OFFICE BUILDINGS	4.5	9.4	7	12.2	7.1	6.9	13.1	11.4	9.2	6.3	13.3	11.6	9.	9.6
PUBLIC BUILDINGS	2.3	1.9	1.3	2.9	2.7	2.7	6.4	4.2	2.8	3.2	3 3	8.9	3.1	4.
SCHOOLS	18.4	18.9	12.9	14.5	19.1	15.2	11.4	16.4	15.4	14.2	12.5	11.6	15.	15.1
STORES	1.8	3.7	2.1	2.5	1.8	2.8	1.3	2.1	3.1	2.7	2.7	3.6	2 1	2.9
THEATRES	7	5.8	1 8	2.	1.	2.8	6.9	2.7	3.7	2.6	2.3	3.4	3.8	3.2
WELFARE (Y. M. C. A. etc.)	1.	.3	.7	1.	.5	.7	1.7	2.	.6	.9	1.5	2.2	1.	1.2

projects proceeded in a smoother manner than for many years before. Investments in mortgage bonds and individual financing of building projects continue unabated and there are no apparent signs to indicate anything but a strong element of confidence in the real estate market and throughout the building industry. In certain districts speculative building has been over-done and it may well be that the volume represented by that field will be less in 1925 than in 1924, but on the other hand institutional and commercial building promises to over-balance this situation.

The handling and shipping of building materials has been greatly facilitated by improved transportation conditions, and this fact coupled with the good production situation, makes it possible to obtain deliveries without undue delay so that the element of waste has been considerably eliminated from the building cost situation. Building material manufacturers are producing and distributing their products today more extensively and more smoothly than ever before in the history of the industry. In spite of the huge building program of the last year, there are no apparent shortages of materials. This is a particularly important fact because the shortage of materials in the past, particularly prior to 1924, has been a definite drag on the developing momentum of the construction industry.

Building finance is in excellent condition, primarily due to the confidence of the public in this field and to the ability of building enterprises to pay well for the use of money. Reports from mortgage companies everywhere indicate confidence in the situation and willingness to aid in any legitimate building project. The amount of money directed into building channels through mortgage bond companies is increasing every year and mortgage bonds have become a standard form of investment in every section of the United States. Secondly, financing has also become easier and with fairly well stabilized building costs, it is probable that building operations can be carried out with an even smaller proportion of equity than at any time during the past few years. Real estate circles report considerable activity in the sale of sites for buildings of all types, including a considerale movement in suburban districts.

The labor situation in the building field promises little or no trouble next year. In the various trades the union scales have evidently been worked out in a manner reasonably satisfactory to all parties and many agreements between labor and employers will probably remain in force at least during the year 1925. As no great disturbance is anticipated in this quarter, this condition becomes an important factor tending toward continued prosperity in the construction industry.

It may also be noted that rentals

BUILDING TYPES	N. EASTERN STATES	N. ATLANTIC STATES	S. EASTERN STATES	S. WESTERN STATES	MIDDLE STATES	WESTERN STATES	U.S.A.
Automotive	$13,038,000	$37,896,000	$3,381,000	$8,604,000	$53,691,000	$25,848,000	$142,458,000
Banks	6,939,000	79,770,000	6,255,000	13,791,000	46,431,000	16,935,000	170,121,000
Apartments	39,879,000	284,931,000	19,077,000	28,881,000	163,779,000	42,810,000	579,357,000
Apartment Hotels	15,030,000	69,270,000	7,275,000	14,670,000	75,165,000	21,945,000	203,355,000
Clubs Fraternal, etc	31,020,000	107,028,000	7,455,000	13,689,000	121,317,000	41,283,000	321,792,000
Community Memorial	7,023,000	24,054,000	765,000	3,765,000	14,454,000	10,971,000	61,032,000
Churches	22,389,000	106,740,000	16,905,000	37,494,000	150,063,000	39,885,000	373,476,000
Dwellings (Under $10,000)	15,837,000	109,281,000	10,809,000	11,904,000	64,497,000	23,394,000	235,722,000
Dwellings ($10,000 to $50,000)	9,303,000	36,636,000	6,594,000	5,622,000	31,086,000	12,699,000	101,940,000
Dwellings (Over $50,000)	4,710,000	21,717,000	1,620,000	4,635,000	15,036,000	7,812,000	55,530,000
Hotels	33,615,000	95,874,000	31,710,000	19,035,000	160,824,000	52,635,000	393,693,000
Hospitals	13,620,000	88,770,000	4,980,000	17,448,000	61,395,000	42,825,000	229,038,000
Industrial	37,770,000	115,089,000	7,191,000	13,698,000	178,050,000	40,569,000	392,367,000
Office Buildings	39,303,000	222,441,000	12,426,000	36,039,000	103,359,000	75,051,000	488,619,000
Public Buildings	8,103,000	51,981,000	4,911,000	12,666,000	51,510,000	57,930,000	187,101,000
Schools	79,335,000	263,784,000	27,291,000	51,687,000	229,641,000	75,120,000	726,858,000
Stores	15,630,000	45,030,000	4,965,000	6,708,000	41,685,000	23,220,000	137,238,000
Theaters	24,450,000	36,495,000	4,944,000	8,484,000	40,512,000	21,096,000	135,981,000
Welfare YMCA, etc	1,353,000	18,417,000	1,305,000	6,171,000	15,096,000	14,298,000	56,640,000
TOTAL VALUE OF NEW BUILDINGS	$418,347,000	$1,815,204,000	$179,859,000	$314,991,000	$1,617,591,000	$646,326,000	$4,992,318,000

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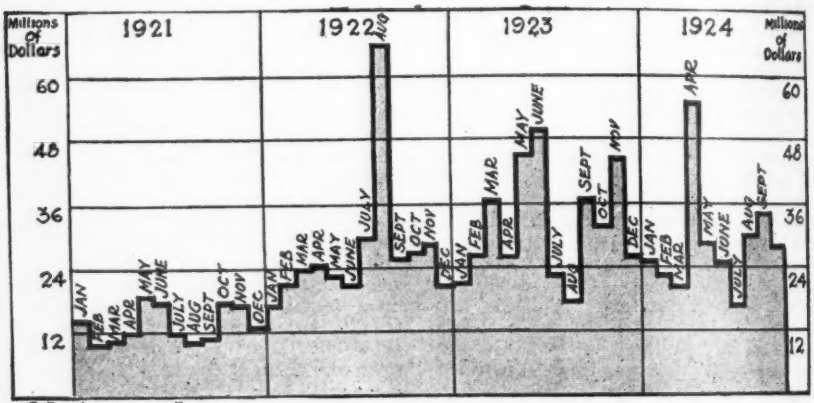
are evidently being well maintained on present levels and consequently building projects offer excellent investments with a strong speculative factor still in evidence. No great change is anticipated in this condition during 1925, as the demand for various classes of building occupancy is still strong except for certain districts and building types where past shortage has been overcome and even here there has been no great reduction in rental income.

Speaking of general business conditions and of the building situation, Secretary Hoover in a recent statement on the economic prospects for the year 1925, says in part:

"The construction work of the country has maintained high activity. While the shortage, particularly of housing and business buildings, due to the cessation of construction during the war, has been to a large degree overcome, yet continued high real wages and general prosperity create a demand in excess of that due only to increasing population, because of the insistence of a population for rising standards of living, for more



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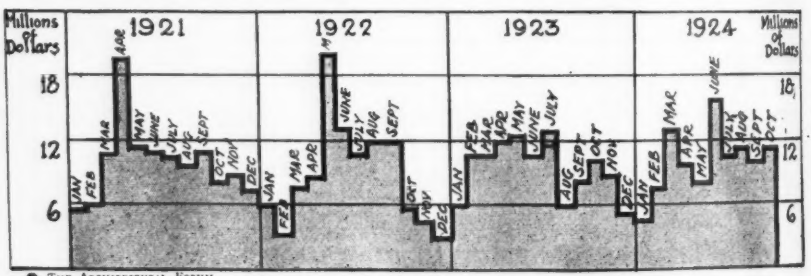
Graphic record of the monthly investment in new INDUSTRIAL buildings during the four years 1921 to 1924



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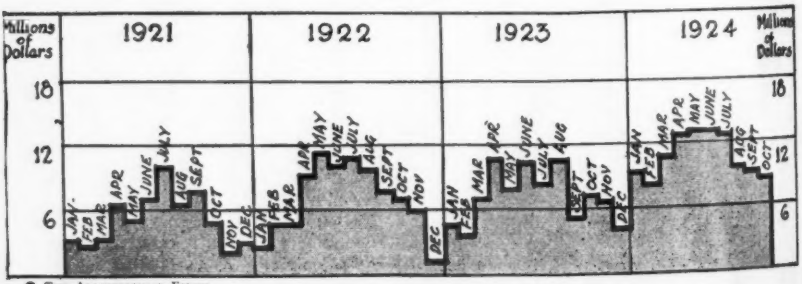
Graphic record of the monthly investment in CLUB and RECREATIONAL buildings during the four years 1921 to 1924



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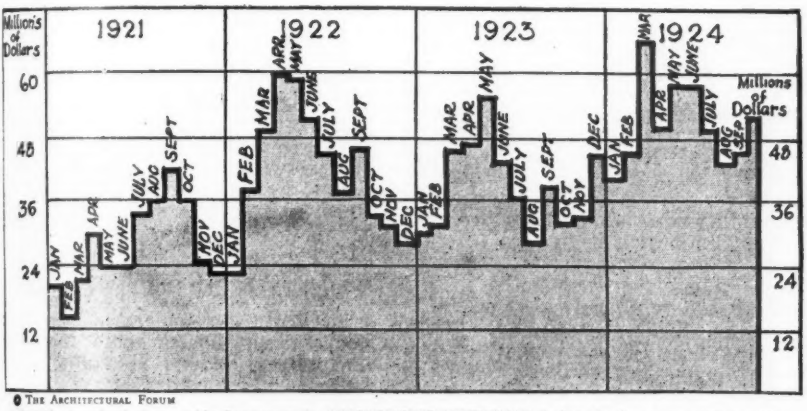
Graphic record of the monthly investment in new CHURCHES during the four years 1921 to 1924

elbow room and better housing generally. One striking factor in maintenance of increased construction activities is the effect which the automobile is producing in increasing the demand for road construction and in causing migration of population in many of our towns to new housing in the suburbs. Another effect of these forces is to maintain rents out of line above the general price levels. With our high real wages and little unemployment, there is no reason to expect any material change in the course of this industry.

"The annual survey of the Department of Commerce shows that the New Year begins with the economic structure of the world upon more solid foundations than at any time since the war. With the exception of a few spots of secondary importance, there has been during the past year a real advance toward social, economic, and political stability throughout the world. The only exceptions are Russia and China, which even before the war contributed less than 3½ per cent of international commerce and of course a part of this



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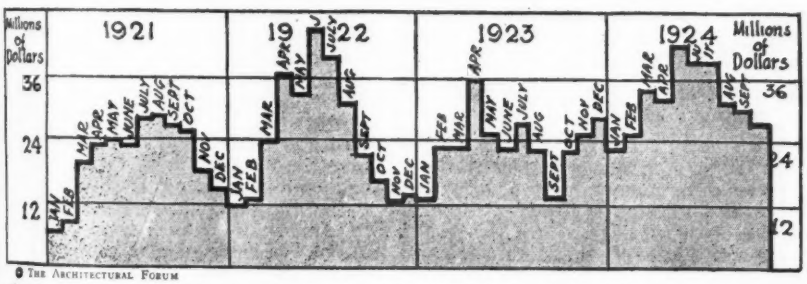
Graphic record of the monthly investment in COMMERCIAL BUILDINGS during the four years 1921 to 1924.



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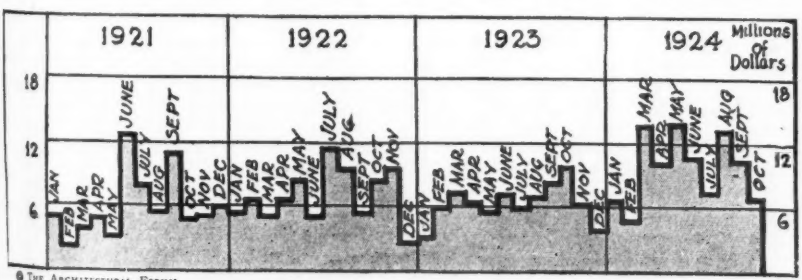
Graphic record of the monthly investment in SCHOOL and COLLEGE buildings during the four years 1921 to 1924



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Graphic record of the monthly investment in HOSPITAL and INSTITUTIONAL buildings during the four years 1921 to 1924

continues. Generally the world is producing more good, there is fuller employment, there are higher standards of living, more assurance of economic stability for the future and more promise of peace than we have seen for many years. The world is by no means free from liability to economic shock, yet the forces today in motion all tend to great promise for the forthcoming year.

"Savings continue at a very high rate, as indicated by the increasing savings deposits, the large absorption of bond issues, and the extraordinary expansion in insurance, thus demonstrating that there has been maintained a high state of efficiency throughout industry and commerce, with little evidence of waste, extravagance and speculation. In fact, the most far-reaching movement in our economic life today is the larger understanding of its broad problems, the better appreciation of the factors of stability, and the definite progress in the elimination of waste, through more stable employment, through better administrative methods and through the rapid march of scientific discovery. That we are able to maintain wages at 100 per cent above pre war while the cost of living is 72 per cent, and the average wholesale price of commodities about 50 per cent above pre war, is the very definite proof of increasing efficiency in production and distribution and of the free flow of competitive action."

Comparative Activity in 19 Types of Building

With this article will be found an interesting comparative tabulation of the relative demands for different types of buildings in various sections of the country. These are expressed in percentages of the total demand and in order that comparisons may be made easily, the percentages from the 1924 Forecast are given beside the percentages for 1925.

An examination of these percentages of demand, comparing prospects for 1925 with those of the past year, indicates some interesting comparisons in various building types. The national percentages given in the right hand column indicate the variation of public interest in the various new building types. Of the total volume of new construction in 1925, the various building types evidently will show the following change in ratio of public interest as compared with 1924:

Type of Building	*Comparative Activity*
Banks	Slightly less
Apartments	Slightly greater
Apartment Hotels	About 20 per cent less
Clubs and Fraternal	Slightly greater
Community and Memorial	Slightly less
Churches	Considerably greater
Small Dwellings	Slightly greater
Medium Sized Dwellings	The Same
Large Dwellings	Slightly less
Hotels	About 25 per cent less
Hospitals	Slightly less
Industrial Buildings	Slightly greater
Office Buildings	Slightly greater
Public Buildings	About 20 per cent greater
School Buildings	The Same
Retail Stores	About 25 per cent greater
Theaters	Slightly less
Welfare Buildings	Slightly greater

It is to be understood that the above tabulation shows relative public interest—not the volume of money to be spent in 1925.

Examining the tabulation further, some interesting comparisons of activity are to be found in the various districts of the country. Those which seem to represent the greatest changes in public interest, are, for instance, office building in the Northeastern States, the figures for which indicate almost double the activity of last year while in the same district the building of retail stores promises to be almost double. Drastic changes in the North Atlantic States are to be found in industrial building which promises to be considerably less in 1925 and in office building which indicates a considerably greater activity. In the Southeastern States most building types are comparatively the same except churches, where greater activity is promised and in the small dwelling field, which evidently is to be more active. The interest in hotel building in both Southeastern and Southwestern States has evidently diminished considerably. While in the Southeastern States school building is evidently to be less, it will be considerably greater in the Southwestern States. On the other hand, in the Southeastern States there will be more residential building than last

year but considerably less activity in this field in the Southwestern States. The Middle States seem to show a considerable decrease of interest in the building of apartment hotels, while apartment building construction will be more active. Greater activity is promised in the residential field in all classes in the Middle States and a considerable increase in factory building is shown. Office building activity will be about one-third less than in 1924 in the Middle States. In the Western States apartment building evidently will fall off considerably as will hotel building, but there will be more activity in the construction of hospitals, club and fraternal buildings and factory buildings. Office building construction in the Western States will be somewhat less but a great interest in the volume of new public buildings is anticipated. Other comparisons in these various classifications may be made for each of the six districts shown in this tabulation. While these percentages cannot be applied with specific accuracy, they do nevertheless represent a clear picture of the trends in each district.

The facts and figures as presented by The Architectural Forum promise for 1925 a sound and prosperous year in the construction industry, with probably more general activity throughout the country and less concentration of record-breaking activity in the New York district. Again, there will be two peaks of building activity, one occurring in the normal spring building season, and another in the late fall, totaling in all an expenditure of nearly $5,000,000,000 for building materials and labor.

New Incorporations

The Olean Cement Products Co. of Schenectady, N. Y., has incorporated for $15,000 by C. and S. and J. De Matteo. (Attorney, J. C. Cooper, Schenectady.)

The National Cement Block & Supply Co. of Toledo. Ohio. was recently incorporated for $30,000 by Floyd B. Fellabaum and Merle T. Johnson.

Western Sand & Gravel Company, Portland, Ore., has been incorporated for $25,000 by C. J. Young, Andrew Koerner and Henry F. Cabell.

Norfolk Sand & Gravel Corporation, Nofolk, Va., was recently incorporated for $5,000 to $500,000; officers, Robert Lacy, president, Baltimore; William L. Parker, secretary, Norfolk; and F. P. Garrett; to quarry and mine stone, sand, gravel and minerals.

Neary & Co., Seattle, Wash., have increased their capital stock from $10,000 to $25,000 and changed their company name to West Side Sand & Gravel Co.

The Universal Gypsum Co., Chicago, has increased its capital stock from $12,500,000 to $24,000,000.

Donovan Supply Co., 217 Smith St., Perth Amboy, N. J., has been incorporated for $125,000 to manufacture cement blocks, artificial stone, building materials, etc.

The Mutual Sand & Rock Co., has been incorporated for $20,000 by Neta F. Larson, Charles T. Mahoney and Arthur Larson; home office, Denver.

Clayton-Kaestner Sand & Gravel Co., Milwaukee, has been incorporated for $100,000—1,000 shares par value $100—by Bruno E. Kaestner, Hay B. Clayton and Rose M. Domke.

The American Mausoleum Co. of Macomb, Ill., was recently incorporated for $60,000 by W. E. Dudman, Geo. E. Bayne and P. E. Elting, to build mausoleums and sell crypts in same.

The Bell Marble Co., San Francisco, Cal., was recently incorporated with a capital stock of 2,000 preferred shares, par value $100 each, and 8,000 common shares, term of existence, 50 years.

The Utah-Idaho Cement Co., was recently incorporated to take over the plant and business of The Ogden Portland Cement Co. of Ogden, Utah. Incorporators are: Chapin A. Day, Ogden; Harold C. Day, Brigham City; Ralph E. Bristol, Ogden; Florence D. Bristol, Ogden, and Ruth M. Day, Brigham City. While incorporated for a nominal amount, the company will increase its capital stock to $1,500,000, which has all been subscribed by the present stockholders of The Ogden Portland Cement Co., an increase of $500,000 over the capitalization of the latter company.

1925 in the Motor Truck Industry

By O. W. HAYES, President, Republic Motor Truck Co., Inc.

LOOKING ahead and making predictions about conditions in the automotive industry six or eight months ahead is apt to prove something of a hazardous undertaking. Situations might arise almost overnight which would upset the most logical conclusions ever attempted. International complications, politics, economic revolutions, catastrophes—any one of a dozen things might transpire to change the trend of our industrial and commercial activities. And yet, in the natural sequence of things, I cannot look upon 1925 with anything other than the greatest optimism, so far as the motor truck industry is concerned. On every hand the signs for one of our most prosperous years are not lacking.

We have come to learn that the motor truck industry itself is so vitally and closely knitted into the very fabric of our industrial and commercial life that whatever affects the latter is bound to have a similar reaction on the former. The motor truck is a big part of the actual production forces of the nation. Therefore, when our national industries prosper, the motor truck has work to do and the truck market booms. When conditions are not good, the demand for trucks lags and the market consequently falls off. We all know this, but it is well to repeat it so as to gain an accurate picture of the relation of national and international conditions to the motor truck market.

My reasons for predicting a prosperous year for the motor truck industry are many. In the first place, the truck industry is on a solid foundation. By that I mean it has not over-expanded its producing capacity, nor has it a big surplus of new trucks on hand to be disposed of. Neither has it, generally speaking, a surplus inventory—a situation which has proved disastrous in some instances in the past.

For the past few years the motor truck manufacturers have been going along on a sound, sensible basis, building only what the demand called for and not attempting to load the dealers with trucks they could not sell. The result is that the truck industry is entering the year 1925 with a clean slate, and all new business will mean the building of just that many trucks.

To ascertain the truck demand requires an analysis of general conditions. First of all, the election is over and industry as a whole seems to be well satisfied with the results. Stocks have shown an upward trend, and while that is not a safe gauge, yet it is an indication. Tax reductions, too, mean a more ambitious industrial program in 1925, because capital will not be so severely penalized as in the past few years. Industrial activity again means a greater call for trucks.

The attitude of the railroads toward the motor truck is another cause for rejoicing, because it means the opening up of another great market for truck sales. The railroads through careful study and research as well as by actual experiments have found that the motor truck is the solution of the threatened congestion problem at the big freight terminals. Already some of the large companies are employing trucks, and there is no question but that this use of trucks will be greatly expanded in 1925. It is true that in most cases the railroads do not purchase the trucks outright, employing contracting companies instead. However, the contractors will need to augment their present fleets.

Then there is the motor bus—one of the greatest single truck markets opened up. At the present time there are about 50,000 busses in operation. It is predicted that this number will be increased to 300,000 by 1930, or 50,000 busses a year for the next five years. As a result of the development of the motor bus, the large centralized schools in rural districts have replaced the "little red school house," and the children of farmers are enjoying educational advantage equal to those of larger cities.

One of the strongest assurances of the future of the truck industry is the tremendous good roads program which is under way in every state, as well as in a majority of foreign countries. Every additional mile of good roads enlarges the market for trucks and busses. When it it considered that many millions of dollars are being spent annually by national, state and county governments on road building programs, the significance of this statement becomes clear.

More Income Tax Law Changes

Written Expressly for PIT AND QUARRY by D. J. HUTCHINSON

SINCE the beginning of the present era of federal income taxation in 1913 nearly every year has seen important changes in the law, and the year 1924 was no exception. The taxpayer has come to regard changes in the law as being as inevitable as the tax itself, and it is often difficult to say which is the more onerous.

In theory income taxation is the most scientific and equitable means yet devised for the support of government, taking from each citizen according to his ability to pay. In practice, however, the application of the income tax, even after eleven years' experience, is still in many respects unscientific and inequitable. Moreover the constant changes, many of them designed to eliminate inequities, produce in themselves a hardship on the taxpayer. He is called on to interpret each year many involved problems in law and accounting of such a complicated nature that he is obliged to support a large body of official and unofficial interpreters to do this task for him as well as for the government.

Of course this condition has been aggravated by the abnormal conditions that have marked the period of our income tax history which has covered for the most part the war and post war years with their unusual demands on both public and private finance. Many things have been done in connection with our income tax legislation on the grounds of public necessity which could hardly be defended on any other basis.

By this time, however, we should be fairly well out of the woods in this respect so that the changes in our income tax methods should mark a development in the direction of a more scientific and equitable system. The changes brought about by the Revenue Act of 1924 as it relates to income taxation should therefore be considered in the light of what they have contributed to a more satisfactory basis of taxation.

Corporate distributions have from the beginning proved one of the most fruitful sources of uncertainty and confusion in the application of the income tax, owing to the difficulty in many instances of determining the the exact nature of the distribution on which its taxability depends.

Corporate distributions are ordinarily of two kinds: dividends paid out of earnings which are income to the shareholder, and therefore taxable; and dividends in liquidation which are paid out of the assets of the corporation and therefore do not represent income to the shareholder but merely a return of his investment. The difficulty in the taxation of corporate distributions to the shareholder arises in determining how much of the distribution in any particular case is being paid out of earnings constituting a true dividend and how much represents a return of investment or a distribution in liquidation. Again although the distribution may be a purely liquidating one so far as the corporation is concerned being paid entirely out of assets, it may and probably will be greater or less than the value of the stock to the shareholder and involve therefore a loss or gain on his part.

In some respects distributions in liquidation are similar to a sale of the stock, the shareholder receiving cash or other property from the corporation just as in a sale to a third person, the profit or loss in either case being determined by the difference between the amount received and the basis of the stock to the shareholder. The basis of the stock is a term used to indicate the basis for determining the profit or loss which may be different from the value of the stock. In general the basis for determining the profit or loss from the sale or exchange of stock or any other property is its cost in the case of property acquired subsequent to March 1st, 1913, and, in the case of property acquired prior to March 1st, 1913 its cost or value on that date whichever is greater.

A distribution in liquidation then which amounts to more than the basis of the stock involves a profit to the shareholder, or if the amount distributed is less than the basis of the stock and the distribution is a final one the shareholder suffers a loss just as he would through the sale of the stock at a similar price to an outside party. Various basis of taxing such gains have been followed in the past. The 1924 Act however seems to put the matter where it belongs, in

the category of a capital transaction. Under the present act the amounts distributed whether in complete or partial liquidation are to be considered as complete or partial payments for the stock. Any gain resulting from the transaction may be a capital gain and subject therefore at the taxpayers' option to the 12½ per cent rate.

Since 1916 the income tax laws have considered dividends paid from earnings accumulated prior to March 1, 1913, the effective date of the first income tax law, as capital distributions on the theory that a tax could not be levied on earnings accumulated prior to the date when income taxation became legal. Therefore dividends paid from earnings accumulated prior to this date have been held for income tax purposes to be a return of capital and not a distribution of earnings.

The logical consequence of this interpretation is that such dividends must reduce the value of the shareholders' investment, since if they are a return of capital the shareholders interest must be reduced by the amount returned. The question then arises as to what value shall be placed on such stock to determine the amount of loss or gain on subsequent sale or exchange of the shareholders interest. The 1921 Act provided that such reduction in value should apply only in determining the loss and not in determining the gain from such subsequent sale or exchange. The 1924 Act remedies this apparent inequity by requiring the application of such reduction to the basis of the stock in determining either gain or loss from subsequent sale or other disposition of the stock.

Logically it must appear that the provision while favoring the government is more defensible than the earlier interpretation which in effect allowed the taxpayer a return of capital twice. Thus if A owned a share of stock in X corporation purchased since March 1, 1913, at a cost of par 100 the basis of the stock to A is $100. Assuming that he received in 1924 a dividend of $25 paid out of earnings accumulated prior to March 1, 1913, under the 1921 Act the value of his stock would be $75 for determining the amount of loss but $100 for determining the amount of gain on subsequent sale. Thus if A sold the stock after receiving the dividend for $110 his gain for tax purposes under the 1921 Act would have been $10. Under the 1924 Act it is $35. Since A has already been allowed the $25 return of capital tax free he should not again be allowed the $25 profit on the sale tax free. Under the 1924 Act he will be subject to the normal and surtax on the full gain of $35 instead of on $10 (or at his option to the 12½ per cent tax on capital net gains.)

Earlier Acts have recognized to some extent the principle, that corporate reorganizations that did not materially affect the ownership interests of the shareholders should not be subject to income tax liability. However this exemption was not complete under the earlier Acts and certain types of reorganization did involve tax liability either on the shareholders or on the corporation or both. The 1924 Act has revised the provisions relating to corporate reorganizations so as to give the widest possible latitude without either the shareholders or the corporation being involved in tax liability as a result of the reorganization.

One of the most common forms of corporate reorganizations is the sale or transfer of the assets of one corporation to another in return for the stock of the second corporation which stock then may or may not be distributed to the shareholders of the first corporation. Under previous Acts such reorganization might result in tax liability. Under the present Act no such liability arises. Thus the A corporation may dispose of its entire assets to the B corporation for a part or all of the B corporation's stock without either corporation incurring any tax liability. The A corporation may then hold the B corporation stock but it is not obliged to do so in order to avoid tax liability on the part of its shareholders. It may distribute such shares to its own shareholders and dissolve its own corporate existence. The shareholders then simply hold a different evidence of the same interest in the same property and no taxable gain or loss has resulted although there may be an apparent change in the value of their holdings. No actual gain or loss for tax purposes is held to have occurred until the subsequent sale or disposition of the shareholders' interest. That is, the tax is postponed until such time as the profit may be actually realized.

This would appear to be the most equitable attitude. While it may

leave the way open for some momentary avoidance of taxes, the tax is not in effect waived but merely postponed until the gain or loss is actually realized. On the other hand reorganizations are often forced upon corporations by legal or business necessities and neither the corporation or the shareholder should be penalized where the only result has been a change in the evidence of ownership. It is much better to postpone the tax until the shareholder or corporation has realized an actual gain through the sale or exchange of interest for money or other property.

In such postponement of the tax the gain realized through the reorganization if any is not entirely lost for tax purposes but is carried forward through the provisions for revaluing the property received in exchange in determining the profit or loss from its subsequent sale or disposition.

These principles of valuation in determining the basis of property apply not only to stock acquired in reorganizations but to other property as well acquired in other forms of tax free or partially tax free exchanges. Such tax free exchanges in addition to the exchange of securities is reorganizations are: (1) exchanges of like property having the same general use, though not necessarily of the same grade (except inventories, stock, bonds, etc). (2) Involuntary conversions such as insurance, awards in condemnation proceedings, etc. (3) exchanges by individuals of property for stock in a corporation where control of the corporation is not involved and the individual's interest remains substantially the same as before. Partially tax free exchanges occur where cash or "other property" (not of like kind or use) are received in connection with an otherwise tax free exchange.

In all such tax free or partially tax free exchanges the principles of valuation for establishing the basis of the property for the purpose of determining the gain or loss from subsequent sale or exchange are similar. In general such value consists of the basis of the property exchanged plus or minus the gain or loss on the exchange less the amount of cash or the fair value of other property received. In the case of involuntary conversions, the cash to be deducted is the excess of the amount required for replacement. The value thus determined of the property received in exchange constitutes the basis of the new property and is the value to be used in figuring subsequent depreciation on the new property and in determining the gain or loss from its subsequent sale or exchange.

For example, if A (not a real estate dealer) owns real estate for which he paid $15,000 in 1920 which he exchanges in 1924 for other property of which the fair value at the time of the exchange is $12,000 receiving in addition $5,000 in cash, the taxable profit is $2,000 and the basis of the new property is $12,000.

Fair Value of Property Received	$12,000
Cash	5,000
Total Received	$17,000
Basis of Property Exchanged	15,000
Gain	$ 2,000

Basis of Property Exchanged	$15,000
Gain	2,000
	$17,000
Less Cash Received	5,000
Basis of new property	$12,000

In the case of an involuntary conversion the application of the above principle would be as follows: A factory built in 1916 at a cost of $200,000 is totally destroyed by fire in 1920. Depreciation for two years at 3 per cent has amounted to $12,000 reducing the book value of the property to $188,000. Appreciation however in property values has increased the real value to $225,000 and this amount of insurance is collected. Replacement is made at once at a cost of $210,000.

Under the 1918 Act there is an immediate taxable profit of $15,000 the difference between the amount of insurance received and the cost of the replacement, and the basis of the new property or cost carried forward would have been $188,000 (basis of former property $188,000 plus cash received in excess of replacement cost, $15,000 less profit of $15,000).

Under the 1924 Act the basis of the new property will be:

Fair Value of Property received	$210,000
Excess Cash received	15,000
Total Received	$225,000

Basis of property exchanged	188,000
Gain	$ 37,000
Basis of property exchanged	188,000
Gain	37,000
	$225,000
Less Excess Cash Received.	15,000
Basis of new property	$210,000

Thus it will be seen that under the present Act the basis of the new property to be carried forward in determining the profit or loss from subsequent sale or exchange is the fair value of the property received in exchange. Under the earlier Act it was the fair value of the property exchanged. The net result of this change in the basis is to carry forward the gain or loss on exchange until actually realized through subsequent sale or other disposition of the property.

Under the 1924 Act recognition is given for the first time to a principle that has been much discussed in the past, namely, the distinction between earned and unearned income. Earned income is defined as that derived from salaries, wages, professional fees, and in general compensation for personal services. All other income it is to be assumed is unearned though not so mentioned in the law. The principle involved in this distinction in its sociological implications is much more important than the possible saving to the individual taxpayer which at the most is $90 per year.

In the first place it gives no real advantage to the small taxpayer since the first $5,000 of any individual's income is assumed to be earned. Nor does it give any advantage to the high salaried executive who labors for his bread over the investor or entrepreneur since the maximum earned income is $10,000, except that a fair compensation is allowed for personal services in a business in which capital is a material income producing factor but such compensation is not to be in excess of 20 per cent of the individual's share in the net profits of the business. Moreover the credit for earned income is limited to 25 per cent of the normal tax.

Thus assume an executive receiving a salary of $25,000 from a corporation in which he is not a principal owner, all normal tax credits to which he is entitled being taken on his wife's return the total saving he enjoys from the earned income provision is $90 as follows:

Income	Rate	Tax
$ 4,000	2 per cent	$ 80
4,000	4 per cent	160
2,000	6 per cent	120
$10,000		$360
Saving—25 per cent		$90

There are a number of other important changes from previous practice in the 1924 Act which space does not permit us to discuss, and conclusions should not be too hasty until we have had an opportunity to judge the operation of the law. In general however it seems that while the 1924 Act clears up certain points that have been troublesome in the past, others of its provisions such as the one regarding earned incomes stray farther than either logic or necessity demand and the truly scientific and equitable income tax law is still to be evolved, if indeed it ever will be.

It is not to be inferred however that the Congress or the Treasury have been at fault in the more or less chaotic conditions that have existed in the past. Not only have the war and post war conditions created extraordinary demands on the fiscal system but the task of defining income is in itself one which can be accomplished only by slow evolution.

Reprints Available

Reprints have been made of the series of articles on "Cost Accounting in the Crushed Stone Industry" written by D. J. Hutchinson. These articles appeared during 1924 in the numbers from September through December 1st.

A large number of these 32 page reprints have already been distributed and they will be sent to producers without charge as long as they last. However there are only 200 left. Address your request to the Editor of PIT AND QUARRY.

State-Owned Cement Plant Bill

On January 21, Frank J. Weber of Milwaukee, offered a socialist proposal in the Wisconsin assembly for a state-owned cement plant to furnish material for highway construction. The bill provides for the creation of a joint legislative committee to investigate the feasibility of the establishment of such a plant.

Chain Drives for Cement Mills

By GEORGE B. MASSEY.*

THE use of silent chains gives one the benefit of the following advantages:

1. Entirely flexible and therefore relieving the motor and bearings of shocks and strains.

2. No slip and therefore a positive and constant relation between driver and driven speeds.

3. No tension on the slack side so that the side strain is that due alone to the net pull on the driving side.

4. The center to center distance of shafts can be reduced to the minimum.

5. The speed reduction with one chain can be as much as 25 to one.

6. Can be run up to 1,500 feet per minute and in some cases up to 2,500 feet per minute.

7. No change in center to center of shaft distance if any appreciable wear takes place.

8. About fifty per cent of teeth in action instead of one tooth in each gear.

9. No back lash or noise.

10. High speed motors can be used with consequent light weight, small space and low first cost.

The pitches run from ⅜-inch to 2½ inches. The usual width of chain from ½-inch to 16 inches. Horse powers from one-half to 350 at 1,500 feet per minute. The maximum revolutions per minute of the smaller wheel vary from 2,200 for ⅜-inch pitch to 425 for the 2½-inch pitch. Pinions should have an odd number of teeth and chains an even number of links. These drives preferably run in oil and casings are supplied for that purpose. The most desirable relation between pitch and chain width is one to four.

Roller Chains

These chains adapt themselves to secondary drives (the primary being silent chain drives). They are used up to 1,200 feet per minute and, as they have a relatively small pitch, the revolutions of the shafts can be quite high. The usual speeds are 600 to 800 feet per minute. The pitches run from ⅝-inch to 2½ inches. The smallest number of teeth recommended is eleven. It is good practice, however, that no wheel or less than fifteen teeth be used.

The following will illustrate the revolutions per minute possible with different pitches:

Pitch	11 teeth	15 teeth	H.P.
¾"	870	640	10
1	650	480	24
1¼	525	380	30
1½	438	320	45
1¾	375	275	55
2	325	240	70
2½	260	192	110

The horse powers given above are for a speed of 600 feet per minute and are for single width of chains. The chains may be furnished single, double, triple or quadruple, the horse power ratio being about as one, two, three and four. Thus, if we have to use roller chain to transmit 200 horse power, we could use a quadruple chain of 1¾-inch pitch or a double chain of 2½-inch pitch. In the former case, the maximum shaft speed with 15 tooth sprocket would be 275 R.P.M. In the latter case the maximum shaft speed with 15 tooth sprocket should be not over 192 R.P.M. The smaller the pitch, the higher can be the speed of the fastest running shaft.

Roller chains have a very decided advantage over detachable chain or silent chains in that they can drive on either side of the chain. This makes it possible to drive one shaft the same way as the driver and another shaft in the reverse direction of rotation. The minimum distance between shaft centers should not be less than one and a half times the diameter of the larger wheel, plus half the diameter of the smaller wheel. The maximum horse power which can be transmitted by roller chains is 400, involving the use of a quadruple 2½ inch pitch chain.

The wheels for this class of chain have to be cut. The side bars are of rolled steel, the pins are nickel steel, hardened, the bushings and rollers are steel, hardened. As these chains have the pins riveted to one side bar, a coupler link must be provided to facilitate disconnecting. An offset side bar link may be used to give an odd number of links if necessary. The working strain which can safely be transmitted varies with the

*Vice President Randolph Perkins Company.

class of service and is greater at slow speeds.

Detachable Chains

These chains are made up in various types for different classes of service, as follows:

1. Plain detachable malleable chain with all wear coming on the links themselves. They are also cast in manganese steel which gives longer life. These chains require special coupling links to connect.

They are used on light transmissions and the working strains vary from one hundred pounds for a chain with 9/10 inch pitch to two thousand pounds for a chain of about 4-inch pitch. In designing drives with this type of chain, a speed of 400 feet per minute is a good maximum although they can be run as high as 600 feet per minute. For transmitting power, the hook end of the link should be ahead, while for elevating the hook end should be behind. Some makers furnish special sprockets for drivers and others for driven wheels, while the majority supply the same sprocket for either driver or driven.

2. Pintle chains are made with the pins either riveted or bolted. There are no bushings so that the wear comes on the pins and the links. The pitch runs from about 1⅝-inches up to about 4 inches and the maximum horse power which can be transmitted is forty. Pintle chains are also made with renewable bushings, confining the wear to these bushings and the case-hardened pins, thereby increasing the life very materially. The pitch runs from 2½ inches to 6 inches and the working strain runs up to 6,000 pounds with the large pitch.

3. Roller chains with steel side bars, either offset or straight, are supplied. They may be had without bushings for slow speed heavy work and with bushings for faster speed. The pitches run from one inch to eight inches and the maximum ultimate strength runs up to one hundred thousand pounds, which, with a working factor of seven for slow speed work, would give 14,000 pounds working load.

Resume

The ratio of minimum to maximum working load covered by the above three types of chains, all of the same pitch, is one to five showing the great range available and the importance of a correct choice of type.

The relative speeds of operation in feet per minute are:

	Usual	Possible
Detachable malleable chain	400	600
Pintle	400	600
Roller chains (cheaper grade)	600	800
Roller chains (best type)	800	1200
Silent chains	1500	2500

As compared with:

	Usual	Possible
Rope drives	4000	4500
Belts	3000	5500
Gear Teeth	600	1200

Where it is not practicable to directly connect a motor by flanged coupling to the machinery it is intended to drive, it is much easier on the motor bearings to use a flexible drive than to have a pinion on the motor shaft driving a gear. The various forms of flexible drive are: belts, ropes and silent chains. The other forms of chain such as detachable and roller chains are not suitable for driving direct from the motor as the speed would be too great.

Artificial Stone Industry Growing Rapidly

The manufacture of artificial stone in various forms has greatly increased in the last three years. A report from the Department of Commerce indicates that in 1923 the total value of this manufactured product reached $53.602,321, while in 1921 the value of $31,768,143 was placed on the output of this industry.

Pennsylvania had 78 factories in 1923 and New Jersey claimed 64 establishments. These manufacturers produced artificial stone in various combinations made from stone, gravel, sand, cinders, quartz and cement.

New Whitcomb Bulletin

The Geo. D. Whitcomb Company of Rochelle, Illinois, manufacturers of gasoline, storage battery, trolley, and combined trolley and storage battery locomotives, has just issued a new bulletin, No. 2512, covering the subject of Seven-Ton Positive Gear Drive Gasoline Locomotives. This bulletin discusses in detail the power unit, clutch, transmission, and construction of Seven-Ton Gasoline Locomotives and their uses and will be sent upon request to all interested.

Keeping Costs at Lime Plants

Written Expressly for PIT AND QUARRY by D. J. HAUER.

"YES," said the general manager of a lime company to the president, as they sat in their office discussing business, "we have a cost keeping system, and it is no doubt better than that used by many other lime producers, but it doesn't suit me. Here are our costs for the last month and they seem reasonable, yet to me they tell little, because there are no detailed costs and I am of the opinion that our quarry costs are higher than they should be, and that this may be true of other items. I figure that if I had a system of cost keeping that would give me every detail of my costs daily, I would be able to tell quickly where we were wasting money and how I could stop these wastes.

"I have been doing a lot of figuring lately, and find if I could save 5 cents per ton on stone produced from our quarry that we could pay an additional cent dividend on our stock, and I have no doubt from my investigation that we could considerably reduce our costs and thus increase our earnings."

"All you say may be true," replied the president, "but you must remember that we have improved our cost keeping system considerably during the past two years and in my opinion we should let well enough alone."

Conversations similar to this have taken place between many business associates. The man putting up the money, such as the president of a large concern, is generally slow to expend money on new ideas and machines. He talks much about efficiency and accurate cost keeping and he attends conventions and discusses these matters there, but he always seems willing to let "well enough alone." For no better reason than this many business men are not making the money that they should. They may be paying dividends and handsome ones, but in many cases their dividends could be larger. But because it means a change and the possible spending of a few hundred dollars, they go on indefinitely doing business in the same way.

A good business man would not think of doing from one hundred thousand to a million dollars worth of business in a year without keeping a set of account books. He knows that within a couple of months his accounts would become so mixed that he could not tell whether he was paying his bills twice or whether or not his customers had failed to pay him. It would take only a few months or a year of conducting a business along such lines to put it into bankruptcy.

Bookkeeping is essential to any business, large or small. Just as important as bookkeeping is cost keeping, and the wise business man today has some kind of cost keeping system; yet it is sad to relate that many of these systems tell very little. There is no exact way with bookkeeping alone, to tell from day to day that money is being wasted or the desired profit is not being made. The only way to do this is by a modern cost record system. If the costs are kept in detail, it is possible to know each day the leaks that may occur, and the cost system becomes the basis of deciding upon the proper method of doing the work.

It does not do simply to talk about these matters and wish for a better cost keeping system, for they can be obtained only by acting. It is true that an operator may devise his own system, and he may get beneficial results by doing so. In most cases it is advisable to call in an expert on costs and have him study the particular operation and then, based upon the knowledge so gained and that obtained from other operations devise a cost keeping system. This is likely to be a much better one than that gotten up by the operator himself.

The general manager referred to above is a man of action. He realized that it was up to him to earn dividends for the stock-holders, who were looking for results and not excuses. He accordingly hired an expert, installed the proper kind of a cost keeping system and a year afterwards, when he and the president were talking about the annual report to be made to the stockholders, both congratulated themselves upon the excellent results that had been obtained through having a cost keeping system that told them something. The general manager was pleased because he could show a decided increase in the earnings which meant not only an increased stock dividend that could be paid the stockholders, but he had also

been able to put aside a surplus fund that was to be used to increase the production of his plant and again lessen the cost of producing their lime. He was the man to feel elated. But the president was just as much elated, for he reasoned that his stock holders would be pleased with the results that had been obtained and that, although he had not been willing to spend money to get a better cost keeping system, yet he had allowed the general manager to have his own way and without opposition from himself. Hence he thought that the result was of as much credit to him as it was to the general manager.

Questions naturally arise about the kind of cost keeping system that should be devised and used. Many operators contend that they can tell from their books used in their ordinary bookkeeping the cost of the work. In a general way this may be true, but bookkeeping is not cost keeping and cost keeping is not necessarily a part of bookkeeping. There should be a separate and distinct system of cost keeping, but if the operator desires it, this cost keeping system can be made a part of the bookkeeping system. The general results obtained from the cost keeping may be entered into the bookkeeping system. Thus, cost keeping can be made supplemental to bookkeeping.

It can be seen from these remarks that the cost keeping system should be separate and distinct from the bookkeeping. In many cases though, when this is done, cost keeping becomes a scrap book affair. There are many people who are always looking to amass odds and ends of information, and when they see something in a newspaper that seems interesting or valuable, they cut it out and paste it into a scrap book, hoping to have some use for it in the future. This use is seldom found, and the chances are that if they should ever desire to use some particular item of information they have gathered, they would be unable to find it in the scrap book. Simply to keep costs, to amass a large number of such reports for a possible future use is time and money wasted. Such cost keeping is like keeping a scrap book.

The most essential value of a cost keeping system lies in having the daily costs that will permit the operator and manager to detect each day the wastes that occur and to eliminate them promptly, and to tell from reports how to improve the work by new methods or machines, or by rearranging men and work so as to reduce costs. To do this costs must be kept in great detail, for it is only by such records that changes can be made that may not only reduce the particular costs that seem high, but at the same time save money on other items of work.

To illustrate by a simple example what is meant by this, the writer will give an experience that he had in stripping a quarry some years ago when such work was done almost entirely by hand methods. He had a gang of men picking and shoveling dirt into a cart and carrying it away. Very accurate and detailed costs were being kept on this work and the daily records were gone over with the foreman each evening. In one of these reports it was shown that the cost of picking had increased that day about one-half a cent per cubic yard. After some talk with the foreman the writer ordered that the next day one of the pickers be put to shoveling and showed the foreman how the remaining pickers would loosen more earth by undermining and caving in a six or eight foot bank. The foreman thought that such a change would be insignificant as the only saving he saw that would be effected would be less than a cent on picking or loosening. Much to his surprise the next evening he found that he had excavated fourteen yards more than the day previous and at a cost per cubic yard of about three cents less. The saving in picking by putting one of the pickers to shoveling meant increasing the yardage so that not only the picking cost less but also the shoveling, the hauling, the dumping and the general over-head of foreman and supervision. In each item there was less than a cent saved but the aggregate meant a tidy sum. It is only by such detailed thoughts that these things can be accomplished.

Another kind of cost keeping that operators should be warned against is that of average costs. These mean little or nothing. For instance, in the matter of blasting in a quarry, costs one day may be forty cents a ton, another day thirty cents a ton, and on a third day only twenty cents a ton. The forty cent cost may be very high and the twenty cent cost may be extremely low, but the average of these three days being about thirty cents would be considered fair and hard to improve upon.

Now instead of taking an average,

the operator would consider his forty cent cost high and he should at once take steps to find out why it was so high and have it reduced. Likewise, if he considers his twenty cent costs he would make a careful study to learn how it was kept so low and then endeavor to see if it would not be possible to keep it at this figure each day.

These ideas lead us to consider how to devise a cost keeping system for lime producing. It is not possible to lay down an exact system for a particular operation in an article of this kind, but it is perfectly feasible to set forth the general principles and to point out the various detailed items of which a record should be kept. In the writer's opinion any cost keeping system cannot be kept with too much detail, so although there are general items of cost, yet by segregating, these general items can be broken up into a number of individual items. The general items of cost for lime producing are as follows:

(1) Quarrying; (2) Transporting the rock to the kilns; (3) Burning the lime; (4) Handling and transporting the lime; (5) Hydrating; (6) Plant; (7) Shipping; (8) Selling and (9) Overhead expenses.

These are the general items, unless part of the stone which may not be suitable for lime burning is broken up and sold as fluxing stone or is crushed and sold for road and building purposes. In the case of fluxing stone, some of the general items of cost are eliminated, but in the case of crushing an additional cost must be kept. Naturally the cost of producing lime starts in the quarry so that our first general item of cost must be further broken up into four details that are included in this work. The four items are:

(1) Stripping; (2) Blasting ;(3) Secondary breaking up; ((4) Loading.

If fluxing stone is produced, these four items will cover the cost of that work with the exception that there must be an overhead charge for plant, also for selling, and a general overhead charge of expenses that are spoken of as "Over head."

In our general items we list that of plant as No. 6, and of course it is possible to keep a plant charge from all classes of work under one item and the total result may be the same as when this item is broken up to cover the different kinds of work. It is preferable to list plant with each class of work as more satisfactory results are thus obtained. For instance, the plant charge for the quarry work might be small and that of burning lime would be much larger so that it would not be fair to pro-rate the total plant charge against each item of work. Then too, if the quarrying is being done to produce lime, crushed stone and fluxing stone, it is necessary to charge against each of these three classes of work the actual quarry costs. Therefore, the plant charge for the quarry should go with that item of cost, just as the plant for each class of work should be charged only to that class.

If some of the stone is crushed, then in addition to the quarry charges there must be kept the following costs:

(1) Crushing and screening; (2) Conveying and storing; (3) Loading for shipment; (4) Selling; (5) Plant; (6) General over head.

These various items can be broken up into more details. For instance, the stripping can be divided into the excavation of overburden and the hauling of it, unless it is done by some method whereby the two operations are in one, as in hydraulic stripping or in using a slack line cableway. If scrapers or hand methods are used in excavating the over burden, the excavation is further broken up into loosening and loading. If a steam shovel is used for the excavation, these two items become one.

For blasting there are two distinct operations, namely, the drilling of a hole and the cost of labor and the explosives for blasting. The drilling costs should always be kept separate from the actual cost of blasting, and in keeping the drilling cost it is well to segregate the work of moving and setting up the drill and other preparatory work from that of the actual drilling. Only in this way the lost time of preparation can be known definitely and be cut down. A record of drilling kept in this manner may show that the work of stripping the ledge is not being done properly for lost time on setting up the drill may be caused by poor stripping.

In keeping the costs of secondary breaking up of the rock, the more elaborate the detail, the cheaper this work can be made. There should be a record of the number of shots made and boulders broken. The costs of drilling should be kept separate and that of labor, and preparing the

charge, from the actual cost of the explosives. When such a record is kept, it may be difficult to reduce this cost of boulder breaking by the methods used, but an excessive cost of boulder breaking with a record of the number of boulders to be broken, would give information that the primary blasting was being done in a poor manner. Thus a study could be made of the spacing of holes on the ledge and the charges used in blasting. It might be found that by slightly increasing the cost of the primary breaking that more than fifty per cent of the secondary breaking might be saved. For the rock would not be broken into such large pieces, requiring less secondary blasting.

In devising cost keeping systems, the best method is to use a large number of small forms rather than to attempt to put all the cost keepings of the day on one large form. Give each man who is in charge of some work a form to make his daily report upon and let him sign it. Thus the drill runner would keep his record of the day, showing the time used in setting up his drill, the number of holes drilled, the number of lineal feet in each hole and the time consummed in drilling each hole. Likewise the amount of fuel he might use, oil, grease and waste. If water must be hauled for the drill or even pumped, this cost should be included in the drill runner's report. The blaster should also keep his own record, showing the number of holes blasted and the charge placed in each. The labor as previously explained should be kept separately from the cost of explosives, explosive fuse and other materials. It is also possible for him to show a record of the costs for furnishing his tamping material. All of these items will allow a close segregation to be made, so as to decide where costs can be reduced.

In addition to these forms for quarry work, there should be kept certain charts so as to obtain units of measurement. There should be a base line laid down on the quarry floor parallel to the breast of the quarry. From this base line a second one should be laid parallel to it on top of the ledge. Thus it is made easy to measure to the ledge from either the bottom or the top. Between these two base lines at certain fixed stations, levels should be run which will show the height of the ledge at given points above the quarry floor. In this way for every blast that is made it is possible to figure the number of cubic yards that are loosened in a blast, and if a block of stone is taken from the ledge and weighed at the various points where the chemical compositions may make the stone vary in weight, it is very easy knowing the cubic yardage to estimate the tonnage shot down in a blast. With this information it is always possible to figure the unit cost per ton of rock drilled, blasted or loaded each day. This is essential that cost keeping may have the value that it should have. Likewise in drilling, charts should be made of the holes drilled and numbers should be given to each hole so as to show on the chart the spacing of the holes and their depth. Such information is an important factor both in figuring the cost of drilling and blasting and in studying the effectiveness of the explosives. It is a very simple problem to make such charts, and even poorly educated drill runners can learn to chart holes on blanks that have been prepared for them.

It must be remembered that if blast holes are spaced too closely, the cost of a primary blasting will be excessive, while if they are spaced too far apart, not only can the cost of primary blasting be increased, but that of the secondary blasting will become excessive as has been pointed out. Exact and proper spacing of holes is important and the only way that this subject can be given a close study is by means of these charts. Where a ledge breaks easily, it is a simple matter to space holes for effective work, but where the ledge breaks in an irregular fashion it is more difficult to decide upon the proper spacing of holes. In order to reduce costs this matter must be given close study.

With the same charts records can be kept of the charges placed in a hole and just how and where the charges are put in each hole. From such records it is possible to experiment and rearrange the loading or charging so as to get more efficient results and so reduce the costs.

The same principles apply to keeping costs of loading. Limestone does not run in ledges of the same composition. In some quarries it varies exceedingly, and it is often necessary to separate the different kinds of rock. For this reason it is not always possible to use steam shovels for loading in lime stone quarries. If one

section of the quarry runs poor, and all the stone from this section is crushed and sold, then a steam shovel could be used for such loading; but if different composition of stone for burning is mixed in successive layers in the ledge and these are blasted down as a whole, then the loading must be done by hand and the rocks segregated as loaded. This would mean that several forms must be used in the same quarry for keeping the cost of loading, and where hand loading is done the costs must be broken up into several items such as sledging boulders, loading the rock, and culling the stone. If steam shovels are used there must be an item kept of the plant costs.

To refer back to the second general item of cost, namely, transporting the rock to the kilns, this item can be broken up into two; that of operating the trains or cars used for transporting, and the cost of the plant. If cars are brought to the foot of an incline and then pulled up this incline by means of a hoisting engine, there will be this third item of cost. Other segregation may suggest itself to those having special problems of transportation. Forms for keeping these costs should be prepared and put in the hands of the men doing this work so that they can turn them into the office each day.

In burning the lime, the detailed keeping of costs that suggest themselves are:

(1) Charging the kiln; (2) Labor attending the kiln; (3) Drawing the lime; (4) Fuel costs; (5) Repairs to the kiln; (6) Plant costs.

With a number of kilns these records should be kept separately for each kiln, and there should always be a tonnage record kept of the stone charged into the kiln and the tons of lime taken from the kiln. Thus it is possible to figure costs two ways; first, based on the weight of the stone; and second, on the lime produced. If a record is kept of the various compositions of the stone, this will give information as to whether or not it pays to burn certain qualities of rock unless the market is high and the extra cost of burning is covered by the sales price. This is a subject that has been given too little attention by lime producers.

There are various ways of obtaining definite data on this subject. An operator should have a small chemical laboratory to make analysis of his varying limestones. This will give him accurate information as to the chemical composition of his stone. Then with the costs kept as suggested for these various rocks he is able to tell accurately and without guessing what stone produces the best lime and at the lowest cost. An operator that has this information, should certainly make more money than competitors who are guessing. This might mean the employing of an expert chemist to start this work and to supervise it for some time, but it would be money well spent. There is no doubt much limestone that is burned that produces a poor grade of lime and injures an operator's sales when this same stone might be sold as a crushed or ground product and make the whole operation a profitable one.

The fuel cost is an important one in lime burning. The grate used in the kiln is an important factor and for large operations there should be some method of stoking the coal. The grade of coal used should also be considered. For low grade coal will not give the necessary heat units for the proper burning of the lime. If costs of fuel are kept separate from labor costs, it becomes possible by trying different grades of coal to decide what coal from a given mine is cheapest in producing a ton of lime irrespective of the initial price paid for the coal. Thus if a high grade coal is tried at a cost of several dollars a ton more than a low grade of coal and yet a better grade of lime is produced at less cost per ton, it is evident that it is cheaper to pay an extra price for the coal.

The same thing is true of the grate. If a poor grate gives poor combustion with a high grade coal, it becomes evident that a good grate will give cheaper lime burning even with a cheaper grade of coal. The best results can be obtained only from a superior grate and the best grades of coal. This shows the necessity of keeping fuel costs not only as to the grade of coal but also on different kinds of grates. Simply because a good lime is being produced at a reasonable cost with the kilns equipped with a certain type of grate does not mean that another grate used would not reduce the cost of the lime production.

Another item of cost that is listed is that of conveying and storing the product. In some cases, this is a

large subject and can not be considered in a few words. There are many systems of conveying and storing the products, and nearly every plant will present a problem of its own. Carts, wagons, trucks are all used to some extent. Bucket-elevators and apron and belt conveyors are likewise used. At some plants the storing is a small item while at others where sales are to some extent by seasons, a large amount of lime may have to be stored and cared for. Thus the money invested in storing can be large and this cost must be figured if a profit is to be made. In keeping the cost of this item it is well to separate the conveying from the storing. The plant item should be figured into this general item of cost for in some cases it is small and in others quite large. Labor costs should always be kept separate from the other costs.

If a hydrating plant is operated, the detailed costs of this work should be kept separate from all other items for the hydrated lime must bring a special price of its own. The items that will suggest themselves in keeping this cost are feeding the lime to the plant and taking it away, the cost of fuel and the labor of attendance and that of plants. There will also be the cost of bagging the lime and conveying it to the place of storage.

There is little that need be said regarding the sixth item of cost, namely that of plant, for it has already been shown how each item should carry its own plant charge. However, this is not a field cost and the men who handle the ordinary cost reports will know nothing about it. The plant cost should be figured in the office and added to the costs kept in the field.

The cost of shipping is not an intricate one to keep whether done by hand or by machinery. It simply means loading the products on to trucks or into cars for shipping and there should be little trouble in keeping a record of this work on a simple form.

If there is a special sales organization, a separate cost should be kept of selling the product; but if the selling comes under the general office force, this is not necessary and may be included in with the general overhead expenses. Selling is most important, and it is sometimes advisable to have a separate selling force.

If limestone is ground and sold for agricultural purposes, a cost keeping system should be devised covering this part of the industry. Outside of the bagging of the product the general method of keeping costs would be similar to that of crushing and the forms used for this work could follow closely in outline those used for crushing. It can be seen by the system of cost keeping outlined that if one product is produced, the results would show each successive step in the cost of producing this single product, but the system is just as well adapted when a number of products are produced from the limestone.

Suppose there are four products produced and sold, namely, crushed stone, ground limestone, run-of-kiln lime and hydrated lime. The cost of quarrying would be divided between these four products not by a prorating, but from the actual detailed cost data kept, based upon the tons of stone hauled to the crushers and the kilns. Thus the costs that would be used in common would be the quarrying and the transporting. For crushed stone the crushing would be added and for ground limestone the grinding would be added to the first two costs unless some of the stone would pass through the crusher. Then there would be an additional cost per ton added for the crushing.

For the lime the quarrying and transporting would be added to the cost of burning, and if afterwards some of the lime was hydrated, the cost for this tonnage would be added to the other items. It can thus be seen that this system is flexible and can be made to cover a number of different products.

Each day the separate forms used for recording the field costs are turned into the office together with the daily charts used, all these reports being signed by the man making them out. The signing of reports is very important, as it makes men feel their responsibility, and many men who would have no conscience about falsifying reports will not do so if they must sign them. When these reports are received at the office, a large sheet for analyzing them is used and all the costs are assembled on this one sheet and carefully analyzed. It is upon this sheet that the plant charges are made, and in order to work up these charges, a separate sheet can be used for each month or period of time that is to be considered.

It is on this office sheet of cost analysis that the overhead costs are charged. Too many operators neglect

keeping on accurate record of this overhead. There are a large number of items that enter into these charges, too many to innumerate in this article. It is because there is such a large number of items that go to make up overhead and so great difficulty in figuring them out and prorating them that business men ignore these costs and thus sustain a loss. If overhead charges become excessive, they can eat up all profits. Unfortunately for quarrymen and lime producers they must often sell products not at the price they would desire but at a price to meet competition; therefore the margin between the actual cost of production and the selling price may be small. Thus the gross profit may be found to be but a little more than the overhead costs leaving a very small net profit.

For these reasons overhead costs should be known, and there should be a determined fight to keep them down. A much desired condition is to add the overhead charges to the eight items of production costs and to this total add a percentage of profit. Such profit would then be net.

Overhead costs cannot be handled in the same manner that the daily costs admit of. An illustration proves this. A ledge is stripped of overburden during the winter months, and possibly enough rock is cleaned up to do for quarrying for two years or more. This can not be charged in a week or month but the costs should be spread over a term of years. Under ordinary practice it is difficult to do this but by the method outlined it is quite simple. From the plan or chart of the quarry an estimate can be made of the number of tons of rock that have been stripped and this divided into the total cost of stripping will give a unit cost per ton of this work. This unit cost can be charged against the tonnage of rock quarried each day.

The same general principle applies to insurance. A plant may be insured against fire and other hazards for a term of five years. Based upon the average output of material during a term of years it is possible to use this average and obtain cost of insurance per ton and this can be charged up daily. This should be the general principle of handling these overhead costs so they can be applied to the units of work done daily.

By the method outlined the cost problem is solved by keeping accurate records of cost. In a small operation it is possible for someone already employed in the office to give supervision to the cost keeping and make the daily analysis, but in large operations it will generally pay to have someone especially employed for this purpose and he may need some assistants. These cost clerks should not keep the field costs, for as already explained those in charge of the work in the field should do this. They should check up these men, however, for both accuracy and honesty. They would make all the office charges, and in addition to this cost work they can handle the time keeping and payroll. If the cost keeping records are to be put into the bookkeeping, these same men can compile the costs for the bookkeeper, who has only to enter the results in his books.

If the proper system of cost keeping is originally devised, the work of these men quickly pays for itself. Naturally, the greatest results are obtained through the first year of their work, and for this reason some operators do away with their cost keeping department believing that they have obtained all the results possible during the first year. They are mistaken in this for with no one to look after these matters, men quickly turn back to old methods and things get going in a slipshod manner. Wastes creep in and profits are eaten up. The price of success is eternal vigilance It is necessary to keep this up in cost keeping as it is in general supervision. The fact is cost keeping is the most important factor in supervision. It is possible for an able executive to run three or four operations scattered in several different states in a more efficient manner with a good cost keeping system than it is for the same man to run one operation, upon which he may spend all his time, without a cost keeping system.

If any lime producer is not keeping costs, he should arrange at once to obtain a good system. If he already has one and it is not devised to show the satisfactory results he should discard his old and obtain a new one. A poor cost keeping system is little better than none.

Many business organizations are now devising cost keeping systems for their members, and it is possible for a lime producer either to use these or to make such changes in them as he may deem best suited to his particular needs. If this is not satisfactory,

he can devise a system of his own or engage some expert to do this work for him. No matter how he obtains it he should have a good cost keeping system. In this way he can handle his business intelligently and face problems of reducing costs so as to add to his profits. There is really no business that is carried on that cannot pay increased dividends if a proper cost keeping system is used and analyzed daily, with the view of eliminating waste, improving methods and increasing production.

Mining Codes

STANDARDIZATION work on mining projects is going forward with increased activity under the procedure of the American Engineering Standards Committee. At the last meeting of the Mining Standardization Correlating Committee, some twelve possible coal mining codes came up for extensive discussion. Immediate work on four codes was finally recommended to the A. E. S. C. and sponsorships were assigned by them. The scopes and sponsors for these codes are as follows:

1. Code for Rock-Dusting.

Scope: Materials and their preparation for rock-dusting mines; methods of applying the dust; methods of inspection and renewal.

Recommended Sponsor: American Institute of Mining and Metallurgical Engineers.

2. Code for Use of Explosives in Coal Mines.

Scope: Suitability of types of explosives for use in mines; handling of explosives in and around mines, and their transportation to and handling at the face; methods and appliances for charging and firing, including inspection.

Recommended sponsor: Mine Inspectors Institute of America.

3. Safety in Mine Transportation.

Scope: Safety provisions for transportation, underground, above-ground at the mine, and haulage on slope or incline into the mine; motor haulage, animal haulage, mechanical haulage, haulage by hand; signals and provisions for safety in construction, tracks, cars, clearances and loads; and operating rules.

Recommended sponsor: The American Mining Congress.

4. Mine Illumination.

Scope: Protection against hazards of different classes of lights used underground in coal mines, including inspection, charging, transporting, and working with lamps; also, the use of lamps in testing for gas.

Recommended sponsor: Bureau of Mines.

These new projects deal primarily with safety and were decided upon after consideration of the general subject extending over more than a year. Some engineers had recommended the formulation of "a model basic coal mining law." After the thorough study given the subject, the Correlating Committee unanimously agreed that such an undertaking was undesirable, but that it was desirable to undertake the preparation of a few simple codes as a guide to mining industry, and which would also serve as a guide in impending legislation. The formulation of each of these codes will be in the hands of a sectional committee, made up of representatives of all the organizations interested in the particular subject.

Considerable progress has already been made on the rock dusting code, and it will be discussed at the February meeting of the American Institute of Mining and Metallurgical Engineers.

The Correlating Committee is also being enlarged to include representatives of the following organizations, which increase the number of organizations so represented to eleven: American Association for Labor Legislation, Coal Mining Institute of America, National Coal Association, U. S. Department of Labor.

One of the main functions of this committee is the co-ordination of the work on the various mining projects going forward under the procedure of the A. E. S. C. In addition to those mentioned above, these are: Electric Mine Lamps, Permissible Portable; Safety Rules for Installing and Using Electrical Equipment in Coal Mines; Storage Battery Locomotives for Use in Gaseous Mines; Specifications for the Testing and Use of Explosives; Screening of Ores; Drainage of Coal Mines; Underground Transportation in Coal Mines; Ventilation of Coal Mines; Ventilation of Metal Mines.

Schultz Resigns

Mr. A. C. Schultz, Chief Engineer for the Kelley Island Lime and Transport Company with headquarters at Cleveland, Ohio, has resigned. Mr. Schultz has been connected with this company in various positions for twelve years

An Interview with John Rice

By FELIX J. KOCH

IN A QUIET room of a Cincinnati hotel a simple question was put to John Rice, the crushed stone king. It was during an intermission in the program of the crushed stone men of the United States that Mr. Rice was asked, "What is the secret of your success?" This question was chosen because it was certain that whatever Mr. Rice might say would prove helpful not only to men in charge of crushed stone establishments, big and little, but to those who might chance to be interested in innumerable other lines. Mr. Rice knows the way of handling men, skilled and highly specialized men as well as rough, give and take, untutored quarrymen. Equipped with this knowledge of men Mr. Rice has built up the largest crushed stone industry under single control in the world. What Mr. Rice directs goes, as his quarrymen say, at eleven stupendous establishments, located principally in New York, Pennsylvania, Massachusetts and Maryland. From these plants there is taken each year a minimum of from a million and a quarter to a million and a half tons of stone.

Mr. Rice was asked for the secret of his especial success. What had he done more or less differently from his competitors to surpass them in the race? He sat for a while thinking, dropping his chin into the palm of his hand, resting his elbow on the chair arm, as is his way when considering deeply. Then he smoothed back his silver gray hair and replied:

"I suppose if there is any thing that I have done differently it is giving men responsibilty. I was born at Pottstown, Pa., but have lived at Easton, in that state, for the last thirty years. The more I came to know people in the Keystone State, and in other places to which I have chanced to come, the more I grew to realize that the best way to bring the best out of a man is to give him free rein, governed only by fixing the responsibility for his course upon him in the end.

"To get at very beginnings, I suppose I saw my first glimpse of the worth of this away back when I was in college. The instructors who put responsibility on the men were those who won from these men friendship, respect, and work. After college I went into engineering, the thing I was fitted for, specializing very largely in bridge work. More and more it was brought home to me how the superintendent and the section boss who guided the men step by step were hated as the slave overseer of old. They secured from those men what they had to give and no more. To be exact, they usually did not get even that. Men vied with men in 'putting one over,' in shirking, slacking up, doing work slip-shod, the instant the boss's back was turned. Watching these things, brushing squarely up with things, I was getting a post graduate course in men, in human psychology, particularly in the handling of men.

"Perhaps it was because I applied some of these lessons to the men in my charge just as soon as definite conclusions on given points had been reached that I began getting a bit more from my men, from 'labor' as the world termed it, than many of my competitors. Things flourished, and after a while I went after some pretty big things.

"Ten years after my first real engineering-contracting job I took over the contract for the ballasting of the Lehigh Valley Railway. That was some undertaking in those times, but it taught me two very worth while things. One was that I was correct in my theory that the best way to bring the best from your men is to give them unbridled responsibility. The other was the super profit in specializing in stone for railroad operation and industrial purposes if one were to stay in the stone field at all. We operate five pretty big quarries in New York State, five in Pennsylvania, one in Maryland, and now there is one in Massachusetts, and the stone goes out substantially exclusively to these ends."

Mr. Rice paused, considering. He gives one the impression that there is a bit of Scotch blood in his veins. He has the slightly florid countenance, the bright, twinkling eye, and above all, that distinct way of stopping to think before he speaks of the canny Scotsman. Perhaps he was waiting for the next question. How far do

you fix responsibility? In reply he said,

"I believe that every right minded man is always seeking to improve himself, to get a better job. So I have let it be known that we expect to keep growing, that as we open new quarries we will have to have men to put in charge, and that it will not be our policy to take men for command from strangers, even though those men may know that rock area better. We shall take men trained by us in our ways. At the moment there are a thousand men, at least, quarrying for us. This number may not seem so huge when compared with the payrolls of other industries, but in the big quarry machinery does the greater part of the work. From these men come the promotions.

"Every superintendent is directed to keep an eye out for the bright, ambitious, willing young fellow, and to send his name and special qualifications in. If that superintendent wishes that man as an aide to himself, we do not over-ride such a request. We do not keep our superintendents from nominating executives because of fear of robbing themselves of good aides. Usually, however, the very willingness, the will to work, in the subordinate excites the friendship of his superior there and makes him a strong advocate for giving that man an equivalent post. Personally I prefer to do that. I like to advance the man to a place where he is completely in charge not still a lieutenant only of his late superior.

"Longfellow, in Miles Standish had something of the result of such a course in mind when he put it:

Rather be first and alone in a little Iberian village,
Than to be second in Rome and under the will of another.

"So we promote these men of ours as fast as we can, as fast as places open. After a while in natural course, a given man will be a superintendent. Then he does go to another place, for an executive can always do better work in command of strange men than when suddenly put in command of peers of a short while before. Going to that new place he carries with him the information gained through his work at the old."

Mr. Rice paused, considering whether to take up another phase of the subject, then continued,

"In spite of experience, he makes mistakes, mighty big ones, mighty costly ones sometimes. And we pay for them and keep him on."

Therein lay one secret of this man's success with men. He believes that all of us are human and that all of us make mistakes. Punishment, demotion, discharging the man, these methods do not cure the ill. Instead the concern pays for the mistake, teaches the man wherein his error lay, cautions others against the same mistake, and then has him go on, a really more ardent worker, if but to make up for the loss which he has caused. Mr. Rice believes this principle is fundamental. He was asked if this policy did not prove to be rather costly.

"You can just guess it is costly," he said, "and we have had mistakes made that have cost us ten thousand dollars, sometimes more. But we always feel that possibly there was an element of blame to rest at our doors. The mistakes came because the person in charge did not know exactly what he was to look after, just how to look after what he had been assigned. Perhaps we should have instructed him more fully. Sometimes, I am frank to admit, some of the blunders have been perfect 'fool' ones. Even then, though, we do not reprimand the man. We lead him aside, and we show him exactly how he erred and make certain that he will not make that blunder again. We believe that it is the best way. He has learned how now, so why dismiss him to take the experience gained at our expense to a competitor?

"When a man makes a blunder, we are sorry for him. We know that if he is the right sort, he is genuinely ashamed. That is bad enough, especially if, down in his heart, he knows that some of his subordinates think that he was wrong in his course at the start. Of course, there are all sorts of people in the world, and some simply will not respond to such treatment. When we are absolutely sure that a man will not respond to this way, he is warned and finally dismissed."

"And you get the material for your minor and then more advanced executives from the vast army trained under this rule?" Mr. Rice was asked. It is understood that throughout the American stone industry Mr. Rice is known for his faculty of hitting on the right men. Once a "Rice man" always one; they cannot be enticed away; they stick.

"Before any man is in our employ very long, there come opportunities to trust him. We must know that we can rely on that trust," was the reply. "Sure of that, before long there comes the opportunity to put extra responsibility on that man. He must respond satisfactorily to that. Granted now his honesty, let him show a certain amount of integrity, and I am willing to give him a try at a more advanced job. I believe that it is only a matter of his being properly taught the essentials of whatever executive post I have in mind for him. He will respond and meet the needs of the situation. Put him in that post and very soon we arrange for his try-out in the next most important place of all. He must demonstrate that he can handle other men. If he can do this to our satisfaction, we are willing to overlook mistakes he may make."

If there is one place, more than any other, where it is difficult to control one's fellow men, it is in the noisy openness of a big, modern stone quarry. The very ozone in the air seems to awaken primordial freedoms in the human breast and urge men to rebel. One of Mr. Rice's secrets in handling men is expressed in three words, Control your temper. A small part of his operations require a bit more technical knowledge than the rest, but for the greater part the modern quarry is not technical. An assistant to the man with the technical education required will very soon grasp all this from his colleague.

"When we are ready to open another quarry somewhere," said Mr. Rice, "we designate those who are to have charge and send them to the spot. They put their heads together, reach conclusions, often go ahead. They want to prove their worth; they wish to show what they can do. We like that; it is exactly what we wish of them. This whole thing that we call Industry, whether it is stone trade or what it is, is all just an evolution. Someone else carried it thus far for us; it is up to us to carry on. We may make mistakes in our part of it, so why not forgive our men for their mistakes in theirs.

"Look at the very latest and greatest revolution in our rock work today, the steam shovel. Is it not built up wholly and completely upon the experience of an endless succession of efforts? It has all been a matter of progress. Why not regard each blunder as an obstacle that has at last been overcome in man's effort to carry progress on?"

It was impossible to draw Mr. Rice out on the subject of what he had done for his men. He had no reply to a question stated that way. A change in tactics, however, resulted in some interesting information.

"We have a profit sharing arrangement," he said, "which gives the employees exactly the same profit that common stock in our company earns. We have no large industrial turnover; we try to keep our men. Maybe one reason we keep them is because we do not make machines of them or house them in structures owned by us as we might house machines. In some of our small quarries, away from centers, we do erect some dwellings to be near the quarries. Otherwise I will not have industrial villages, not unless the population were so large that it would build a normal town. My men live wherever they choose, which is usually in the nearest community, of course. To help them to and from this community we pay for a truck that carries them back and forth. There are no company kitchens, dining rooms or stores. They are the first step toward a despotic padrone system; they lead to dissatisfaction that proves a boomerang absolutely sure to rebound.

"Much attention has been given to safety in the quarries. The real danger comes in loading and tamping because men will forget and grow careless. When we shoot the big shots, everyone is on guard so that there is almost no danger there. Men will not take chances on accident in direct ratio with the size of a shot. Again and again we bring down a hundred thousand tons of stone in a single shot shooting five to six hundred feet along the face of a cliff and taking in as much as forty feet from that front. Firing is done by electricity, and there is really no great danger, for everyone knows and everyone keeps well away.

"Loading and tamping accidents will happen. I do not suppose the time will ever come when highway and railway ballast and the rock that goes into concrete work will not have a tale of accidents of varied sorts to account for. Accidents will happen; mistakes will happen. The best way is to pay for the accidents, to pay for the mistakes and to start over again. It makes better men of those responsible, and it promotes better feeling.

Busy in Tennessee

Spring Season Not far Away. Bids for Road Supplies Being Let. Rates on Materials and Other Doings.

By Our Memphis Correspondent

THE STATE of Tennessee department of Highways and Public Works, on January 22 made further lettings of road contracts to the extent in the aggregate of about seventy-five miles and several bridges in the counties of Meigs, Carter, Cannon, Rutherford, Marion, Pickett, Wayne, Hardin, Robertson, Jackson. J. G. Creveling, Jr., is Commissioner. The awards went to contractors in various cities north and south. With lettings made in 1924 approximately $10,000,000 of highway work will be furthered in Tennessee, much of it gravel or macadam or concrete.

The rates on sand and gravel on the Mobile and Ohio R. R. and the Nashville, Chattanooga and St. Louis R. R. from Camden to Henderson, Tennessee were ordered reduced from $1.00 to 97 cents per ton on intrastate shipments by the Tennessee Railroad and Public Utilities Commission on January 29. The order followed a hearing upon the complaint of the Memphis Sand and Gravel Co. in which it was declared the old rates were unsatisfactory.

Bids were being received at Memphis by the Shelby County Commissioners, February 9 for the annual supplies of road materials, bridge timbers, culvert pipe, road oils, limestone, road gravel, sand, cement, etc. E. W. Hale is chairman of the commission.

Prospects of a geological survey of West Tennessee are contained in an announcement by Thos. B. King, manager of the Good Roads Department, Memphis Chamber of Commerce. Wilbur A. Nelson, state geologist has been invited to Memphis for a conference with the city's business men relative to the proposed survey. The object of the survey will be a study of the raw materials of the section, labor, power, transportation and distribution facilities.

From all appearances the spring season is not far away and in the Memphis section gravel and sand firms feel optimistic about spring activities. Because of the rains and wintry weather in January and early February business was somewhat dormant. Following a very large activity in 1924, when building construction records in Memphis alone went over $23,000,000, the January building fell off very much, permits being $796,250 as compared with $1,660,750 in January 1924. There is much large work planned, however, and it is apprehended the spring and summer will be very active. This of course has an interest for the sand, crushed stone and other material trade, cement, and rock products. The matter of paving and road building in the tri-states under plan also looks good, but at this writing due to weather conditions, with but few instances it has not started.

Quarries in the Memphis section are active, though not running full capacity, movements by river and rail are satisfactory. Railroad inquiries and road building inquiries are numerous. In the former category, many lines in the south and central states are improving their road beds and in some instances laying new mileage.

The Signal Mountain Portland Cement Co. at Chattanooga, Tenn., is said to contemplate an increase of its capacity early in the present year. The Hermitage Portland Cement Co. at Nashville, Tenn., at their large plant near the Cumberland river, opened about a year ago, are having a big activity. Clay industries in Henry and Carroll County, West Tennessee and around Holly Springs, Mississippi, are active.

Northeast Mississippi is developing a new bauxite field, that is said to possess great possibilities. Representative John E. Rankin, of that district has had some interesting reports from the Geological Survey. The product is very useful in the aluminum, chemical and refractory trades.

The Carroll Land Co. has organized at Carrollton, Miss., to develop gravel beds in the western part of that county. It is capitalized at $40,000. Ashleigh Harleson of Greenwood, Miss., and J. H. Hobson of Hattisburg, Miss., are mentioned among the incorporators.

Big road improvements in Hinds County, Miss., near Jackson, are contemplated, the board of supervisors late in January getting authority to issue and sell $2,000,000 of bonds for the purpose of building 96 miles of hard roads, to which sum a federal allottment will also be added.

The cement interests of Cape Girardeau, Mo., featuring Marquette products have furnished material on a great number of sky-scrapers.

Excavating by Hand

IN VISITING many sand and gravel pits and quarries throughout the country one finds that much excavation is done by hand methods. It is true that no matter how many types and kinds of excavating machines are placed upon the market, there will always be some work that must be done by hand, such as short trenches, deep, yet limited pits and foundations, and other small excavations. However, this fact is no excuse for doing more extensive excavating jobs by hand.

One frequently hears an operator say, "My work is too limited to employ machines. I only move forty or fifty tons per day and I can do this cheaper with men."

A remark like this is not thoughtful, and generally means that the operator either does not know much about modern machinery, or else is unwilling to spend money to purchase machines, little realizing that he is paying out much more in a limited time for labor than the price of the machine.

It is remarkable how the mind works and how easily it is to become accustomed to anything that may be wrong. One case will serve to illustrate this point. In a quarry for nearly two years an extra man was employed to keep stone flowing to the bucket elevator. Nearly a thousand dollars had been expended for this purpose before any improvements were made. One of the first things done was to fix up a chute for this purpose at a total cost of eight dollars and fifty cents, thus saving the wages of a man. Anyone could have done this weeks and months before, but such things are permitted to go on indefinitely. One trait of men is to put off until tomorrow that which can be done today.

This is just as true of hand excavating. So accustomed does a man become to this, now obsolete, method of digging dirt, that in many cases it is continued for months and even years when really an operator may feel that he could save himself money by purchasing some machines.

Today with wagon loaders one man shovels and other devices it has been proved that with only a very limited yardage, considerably less than one hundred cubic yards, machines can excavate this material at a much smaller cost than with picks and shovels. It may be true that the machine if run to its full capacity might excavate in a day four or five times the yardage needed to be moved, but one beauty about the machine is that if it lies idle a greater part of the day, the cost is little or nothing provided other work is found for the few men who may be employed in making the excavation.

Most of these machines can be operated by one man, and with a helper the entire excavation can be carried on. It is always possible to use these two at some other paying work if the excavating machine is not operated. In one operation with a small steam shovel run by one man, and using a helper to spot cars, it was found that operating the machine for less than four hours per day, an hour or two in the morning and less time in the afternoon, sixty cubic yards of material was excavated each day for but little more than half what it had cost to do the same work previously with men and picks and shovels. Thus the saving effected soon paid for the excavator.

The same things are true of rock excavation as of earth or sand and gravel. It is possible in small quarries to use excavators to pick up the blasted rock, and load it into cars or other vehicles. In nearly every case the regular excavation work in any pit or quarry can be done by machines to a great extent making the operator independent of the labor market. The decreased cost will more than pay for the machines used, while the fact that but little labor need be employed allows the operator to go on producing without interruptions due to a lack of labor.

To assist those who may not be familiar with the various types of machines on the market, the leading types will be mentioned and comments made upon their use. All machines named can be used for either large or small projects and in many cases can be employed for more than one class of work.

Today there are on the market quite a number of makes of wagon loaders. These for some materials may need a little help with pick and shovel, but this is a small item as compared to the cost of doing all the work by hand. These machines can be used in loading vehicles in stripping sand, gravel or stone. They can

excavate and load sand and also gravel. While they will not excavate blasted rock, yet they will handle at a small cost crushed stone from stock piles. These loaders have proved very valuable in reducing costs for many pits and quarries.

For excavating in sand and gravel and for stripping both pits and quarries, slack line cableways have during the past ten years opened up a new economic field in excavating. These machines not only excavate but also transport the material to the plant. The buckets or scrapers are made in different sizes so that if a limited amount is to be excavated in a day, a small size bucket can be used and this means a smaller hoisting engine for operating the cableway. There are a number of different types of buckets meant for excavating in different kinds of soils. These machines will excavate under water as well as on dry land.

Today there are on the market a large number of small size power shovels. They are operated by steam, gasoline, and electricity. Nearly every one is familiar with the small size revolving power shovel, that has come into very general use. This size of shovel is adapted to many operations, mounted either on traction wheels or caterpillars. One or more can be used in a pit or quarry, not only for stripping but for the handling of rock, gravel or sand. For very large operations there are larger sizes of steam shovels that can be used.

In this discussion we are more interested in the smaller operations where hand excavation is still in use, and for such workings there are now on the market a number of so-called "one-man shovels." These machines are operated by one man and can be handled up to one hundred and fifty to two hundred cubic yards of material in a day. They will excavate in blasted rock as well as in earth or sand and gravel. Most of these machines are mounted on caterpillar tractors. These machines are almost human in their work, for they will do much of the excavation that is usually done by hand.

Locomotive cranes with grab buckets have been in use for many years, but within the last few years there have been put on the market a number of smaller cranes that are well adapted for excavation in pits and quarries where a limited amount of material has to be moved. These machines are not only valuable for this kind of excavation, but are useful for rehandling materials for storing stock piles, but also for loading the same materials from the piles into vehicles or cars.

Construction and Construction Materials Report

A HANDY summary of facts and figures on the construction industry has been issued by the Department of Commerce in the shape of a pamphlet reprint of the articles on Construction and Construction Materials contained in the Commerce Yearbook for 1923. This includes a 24-page article on "Construction" and 19 pages on certain construction materials such as lumber, cement, structural steel, burned clay materials, building stone, crushed stone, sand and gravel, also 25 concise tables of basic statistics and five diagrams to show principal tendencies.

The term "Construction" is defined as meaning to cover construction and alteration of buildings, roads, canals and locks, bridges, railroads, harbor works, subways, tunnels, water supply systems and other work that produces a more or less fixed structure or alteration of the natural topography. It is not used to include ships, railway rolling stock, ore moveable machinery. "Construction activity is most properly measured in terms of employment of men and equipment and consumption of materials and supplies."

The close relation of construction to general conditions and business cycles is discussed, showing that extensive construction of buildings results both in large employment of building trades labor and in active production of lumber, cement, brick, stone, sand and gravel, lime, iron and steel, metals, hardware, paint, electrical equipment, furniture, textiles, etc. Such building activity is influenced both by cost of building and interest rates. High prices, high wages and high interest rates are likely to accompany each other in the business cycle, and when the feeling becomes general that they are due to decline, building operations ordinarily slacken.

The Fremont Sand & Gravel Co. of Fremont, Neb., was recently incorporated for $30,000 by A. A. Nehrbas, Clarence King and Arthur Baldwin.

This Small Sand and Gravel Plant Enjoyed Profitable Year

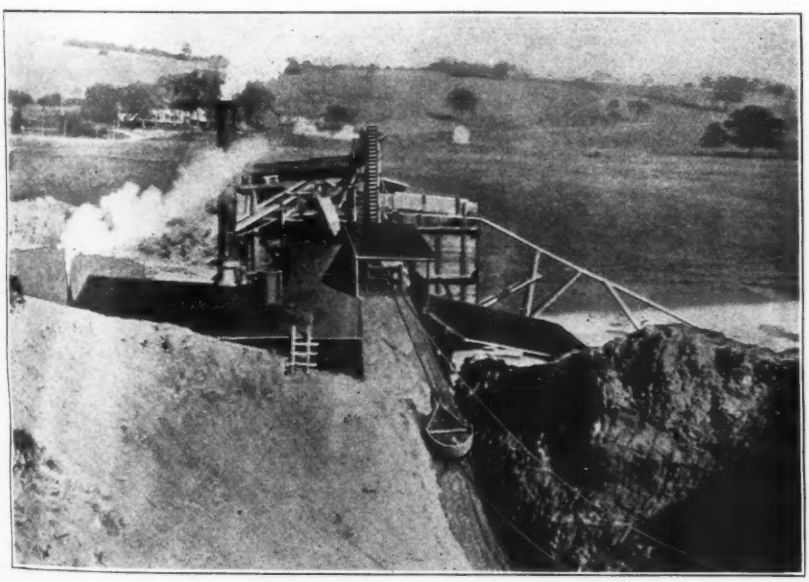
Valley View Sand and Gravel Company of Troy, New York, Producing 150 Cubic Yards Daily with Force of Four Men

DURING a recent sand and gravel convention several producers expressed doubt as to the profitable operation of sand and gravel plants with a daily capacity of 150 cubic yards or less. They insisted that a small market was really hard to develop, that it was much more difficult to hold after it was developed. Many other factors were mentioned such as possible labor handicaps, little or no return on the money or time invested, poor shipping service, etc.

There are no doubt many advantages to be gained in operating a plant with a capacity of from 700 to 1,000 yards daily. There are advantages also in operating the small plant. Some producers are operating several small plants with a large aggregate production, and they would not consider operating any single plant with a capacity greater than 500 cubic yards a day. Such factors as market, labor costs, character of material, cost of operation, and extent of deposit should really be the deciding factors. Some producers are proving that a group of sand and gravel or crushed stone plants of medium size can be operated to better advantage than by placing all the capital in one large operation. Fixed charges, cost of operation, freight rates, etc., could all be more economical under such a plan.

The Valley View Sand and Gravel Company of Troy, New York, operated a small plant during 1924 to advantage. The material was all disposed of. The plant operated full time all year with a very gratifying result. A good clean washed gravel was produced. A practical proof that the enterprise was worth while was provided by the profits that resulted.

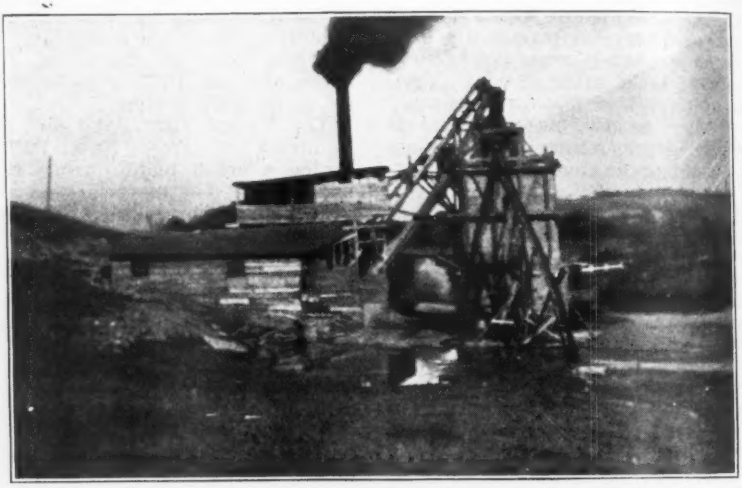
The plant consists of a one cubic yard Sauerman Crescent power drag scraper bucket and a Sauerman hoist. The material is brought in from a 300 foot face to a grizzley screen with a 2 inch opening. The material under 2 inches drops into a hopper

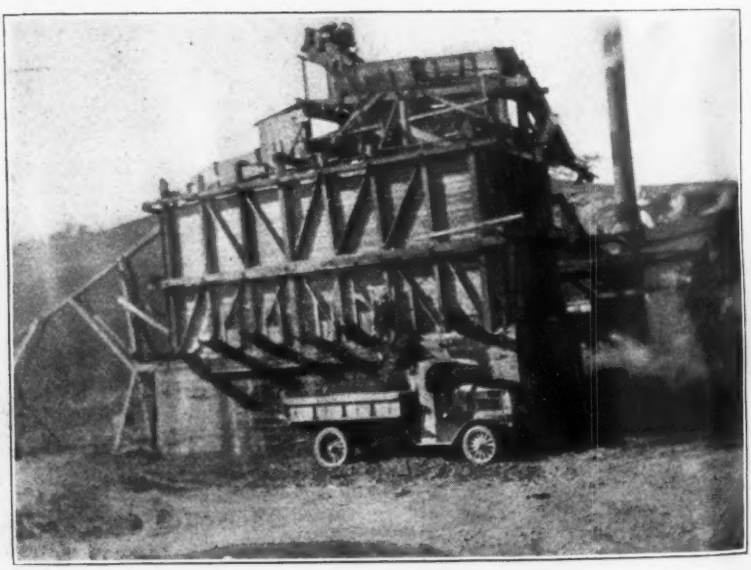


View of Plant and Pit.

over a Jeffrey feeder. The Material over 2 inches rolls down to an Acme 9x16 jaw crusher which reduces it to the 2 inch size. The discharge from this crusher drops on to the end of the feeder and is conveyed to Acme elevator buckets 52 feet center. These elevator buckets raise the material to a 16 foot by 36 inch screen which separates it into the correct sizes. These screens are located directly over the storage bins of 300 cubic yards capacity.

All material is washed by a 5 inch stream of water from a 6 inch Gould centrifugal pump. The sand passes through a series of tubs where each of the four sizes produced is separated from the loam by passing over miniature falls. The loam is carried off by the vast volume of water to the deposit bank. The power unit consists of a 50 h.p. Vim engine and a 100 h.p. Ames boiler. The tailings are raised by a belt conveyor to a chute which returns them.





Two Views of Valley View Plant.

The Rayburn Sand and Gravel Plant Adopts Its Own Excavator

This Plant Started to Afford Experimental Opportunities Results in Rayburn Triple Action Slack Cable Excavator

SEVERAL weeks ago an announcement appeared in PIT AND QUARRY under Recent Patents that Charles F. Rayburn had been granted a patent on a piece of equipment designated as the Rayburn Triple Action Slack Cable Excavator. The Rayburn Sand and Gravel Company of Moscow, Idaho, was organized and a small plant was operated to try out Mr. Rayburn's ideas on his new piece of equipment. The plant was also to furnish washed sand and gravel to the trade. Moscow has its share of building each year, and clean washed sand and gravel can only be secured locally from the Rayburn Sand and Gravel Company.

The plant is located one mile from Moscow on South Palouse Creek. The equipment in this plant includes a 1/3 yard Rayburn Triple Action Slack Cable Excavator weighing 750 pounds, a Brigerts 5x5 double cylinder, double drum engine, a Case portable 18 h.p. 140 pound pressure boiler and a 2½ inch Morris centrifugal pump gas driven. The total span from the foot of a 50 foot mast to the rear dead man is 350 feet. The average digging distance is 300 feet. During extremely high water two men are employed. This includes one operator and a fireman, but when it falls, only one man is needed, the operator. The excavator makes hourly an average of 70 trips. Mr. Rayburn in order to win a wager, made 108 trips during an hour.

Some of the advantages claimed by Mr. Rayburn for his excavator which has been named from its dumping actions, three simultaneous actions, are very interesting. It dumps at any speed, any place, at will of operator without any dumping devices on slack cable. It is a speedy and snappy, simple dumping mechanism, abiding with the laws of gravity. It automatically changes its center of gravity when digging, traveling and dumping, all done by one line, the center chain. The center of gravity may also be changed by lengthening or shortening the rear connecting chains or center chain. When in digging position the center of gravity is adjusted by the line pull exerted by drag line through the center chain and after such adjustment is made,

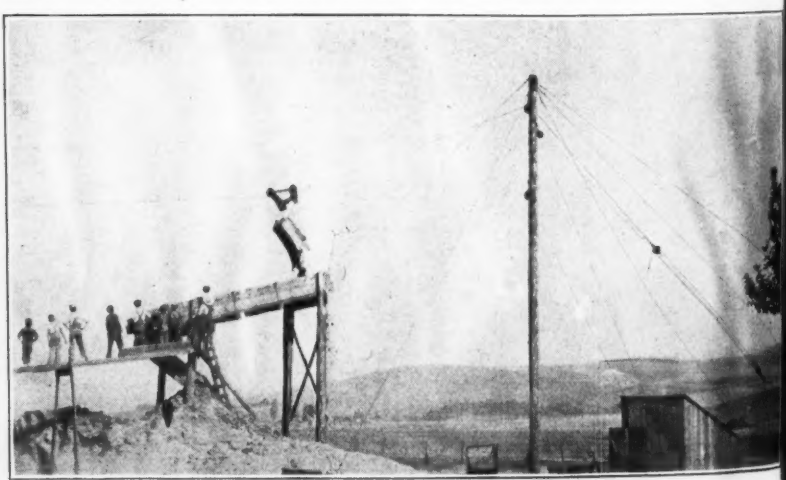
General Veiw of Plant and Property.

Close-Up View of the Rayburn Excavator.

center chain is relieved of line pull and transfers it to bridle chains, these bridle chains then taking the line pull for digging operation. When returning to digging point it travels in its dumped position and by so traveling in said position no jerk or strain is exerted to dragline when wishing to stop its downward journey. When digging force exerted by dragline falls on bridle chains, when lifting or traveling to the dumping point, this force is automatically shifted to center chain and thus avoids dumping when operator does not desire machine to dump. The machine will free itself from boulders or other unseen obstacles by slackening of dragline and raising slack cable. By its own dumping actions it is self cleaning.

Cement in South America

The International Cement Co. is spending $2,000,000 in Montevideo and Buenos Aires on plant expansion according to Holger Struckmann president. Outlook for business there is brighter than for a long time due to the election of President Coolidge.



View Showing Excavator Releasing Load

The Triangle Sand Company Has Market Advantage

This Small Plant Needs Only Grade One Size for Market Material Distributed Within Five-Mile Radius by Truck

SOME of the most profitable small sand and gravel operations in the country enjoy advantages in their market situations. The Triangle Sand Company, Incorporated, is such a small profitable sand and gravel company operating on its own property at Mamaroneck, New York. The product of the plant is either sold at the plant or loaded into their own Mack trucks and delivered to a market that is within a five mile radius. The gravel sold is all screened to one size, that which will pass a screen with a two inch opening. A ready sale is found for this; therefore no attempt is made to prepare any other grade.

The plant consists of storage bins on top of which are located a Link Belt washing screen with scrubber attached and a Link Belt sand separator. This equipment has a capacity of 30 yards per hour. This screen and separator were fed by a slackline cableway until last spring. It is expected that the property will be sold for building lots within the next few years. It was desirable, therefore, to leave the floor of the pit comparatively flat in order to bring a higher price when sold as real estate. The pit is comparatively shallow. These facts largely influenced the change in operations that were effected last spring.

At the beginning of the season last spring a 300 foot track was installed from the top of the plant down a trestle and into the pit. A two yard automatic gable bottom Easton car was installed and the drag cable of the discarded dragline outfit was utilized with the steam hoist to pull the car up the track from the pit when loaded. The car is returned by gravity. A large Haiss Creeper loader was installed in the pit to load the car. This loader has a special extended swivel spout giving it a much longer reach. The swivel spout is rigged up with a hand wheel and worm so that it can be swung as desired by the loader operator. With this extended spout it is possible to cut a width of 45 feet with one setting of the track. That accounts for 22 feet each side of the track. It takes two minutes or less to load the car. The car makes the round trip from

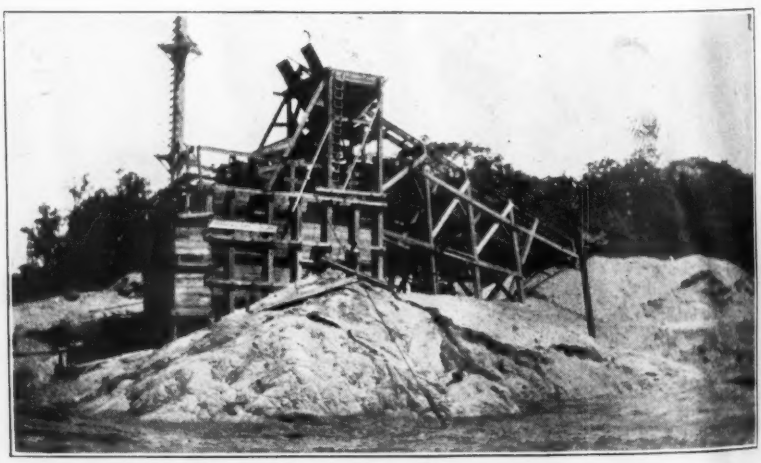
General View of Deposit.

The Loader Showing Special Swivel Spout.

the loader to the screening and washing plant and back in two minutes or less. The capacity of the plant is about 30 cubic yards per hour or 300 per day. This layout has enabled the company to supply all trucks for delivery and all trucks sent for purchase of material at the pit and also to start a stock pile of screened material for winter distribution. The output during 1924 was increased about 70 per cent over 1923 production.

The force employed consists of an operator for the loader, one man to break down the gravel and two men for the screening and washing plant, one of whom operates the hoist. This is the same number of men used to operate the old plant. There is the additional operating expense of the loader and the fixed charges of the loader, car and track. However they have increased production materially, and they have increased the potential sales value of the land which probably offsets the increased cost.

The officers of the Triangle Sand Company, Incorporated, are J. O. Lange, President, E. H. Gedney, Treasurer and A. H. Gedney, Sec.



View of Screening and Washing Plant.

Brazilian Cement Plant

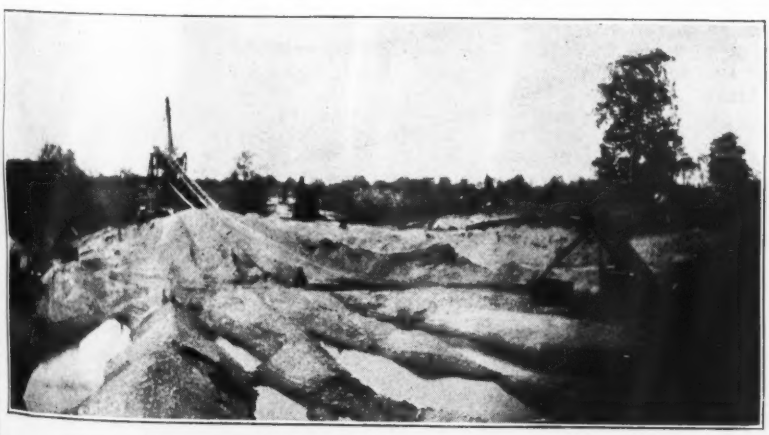
The Brazilian Portland Cement Company is building the first cement mill in that country. This plant, which is located about 12 miles from Sao Paulo, will have a capacity of 1,000 barrels per day and will be completely electrified.

General Electric equipment has been ordered for the plant, including one 200-horsepower and two 500-horsepower synchronous motors; three 500-kv-a, 44,000/2300-volt transformers; switchboard and substation switching equipment, two 50-kilowatt motor generators and 24 motors ranging in size from 10 to 100 horsepower.

Increased I. C. C. Appropriation Recommended

The House of Representatives' Committee on Appropriations has recommended an appropriation of $6,853,962 for the Interstate Commerce Commission for the fiscal year ending June 30, 1926. This is an increase of $1,940,462 over the amount recommended by the Bureau of the Budget and also in increase over the appropriation for the current fiscal year ending June 30, 1925, of $2,212,098. In the report accompanying the bill the committee called attention to the increasing volume of work handled by and required of the Commission.

View Showing Industrial Track to Plant.



Distant View of Property.

The 1925 Slate Conference

THE 1925 Slate Industry Conferences at the Hotel Commodore, New York, have passed into history marking the most successful and representative gathering of slate interests in the history of the industry. From the moment the Slate men from all parts of the country began to assemble on Monday, January 19, to the final adjournment of the conferences of roofing slate producers and roofing contractors on Wednesday, the 21st, there was maintained a keen interest in all that pertains to the advancement of the production and uses of slate.

Over two hundred and fifty producers, dealers, roofers and setters met for a discussion of their general and specific problems, coupled with the luncheon gathering arranged by the concerns who furnish this industry equipment and supplies which brought upwards of seventy-five representatives of such firms in close contact with the men to whom they provide the tools and materials of their trade. Government experts, presidents and representatives of National Associations having relations with the Slate Industry, scientists who are versed in the uses and effectiveness of slate under all conditions, gave to the conferences a wealth of information and results of research which will have adefinite effect on the future of the Industry. Many questions that have interfered with the progress of the industry and the use of slate were cleared up. The consensus of opinion was that at no time in the history of the Slate Industry had there been such an advance recorded with promise of permanent progress as the direct outgrowth of these sessions.

Albert Kelsey, the noted Philadelphia architect, was heard in a fine address which contained many helpful and informative facts, as well as providing an inspiration for better things during the new year. James S. Hamilton, Industrial Commissioner of the State of New York, extended through deputy, Richard J. Cullen, a welcome as the personal representative of Governor Al. Smith. Messages were read from other governors of Slate-producing states with a climax furnished in a telegram of good cheer from President Coolidge whose native state of Vermont is prominent among the important slate producing states.

Following the luncheon, those in attendance met in various groups for discussion of specific matters relating to their particular interests, including Miller and Roofing Slate producers, with G. H. Shinville in the chair. Dealers and Jobbers Section, E. J. Johnson presiding; Crushed and Ground Slate producers, Chas. A. Long, Chairman; Setting Contractors, with Messrs. Kenney and Henry leading the discussion; Roofing Contractors, under the leadership of Messrs. Daniel, Fell and Miller; Miller and Roofing Slate Salesmen, F. H. Abel and John R. Hoffman in charge.

G. F. Loughlin of the U. S. Geological Survey released their advance report on estimated slate sales for 1924. which showed a total of $11.816.000. only 2 per cent less than 1923, the best year of the industry. This slight reduction in spite of the serious labor troubles in some of the Pennsylvania districts which so seriously crippled the industry and greatly reduced their output, clearly indicates that the industry as a whole shows a healthy improvement which under normal conditions would have made 1924 far and ahead the banner year of the industry.

A series of experiments, tests and research arranged by the Research and Tests Committee, W. A. Kitto, Chairman, were conducted by Robert Notvest, imparting much information on some of the abstruse problems related to the uses of electrical slate and the acid and alkali resistive properties of all slate.

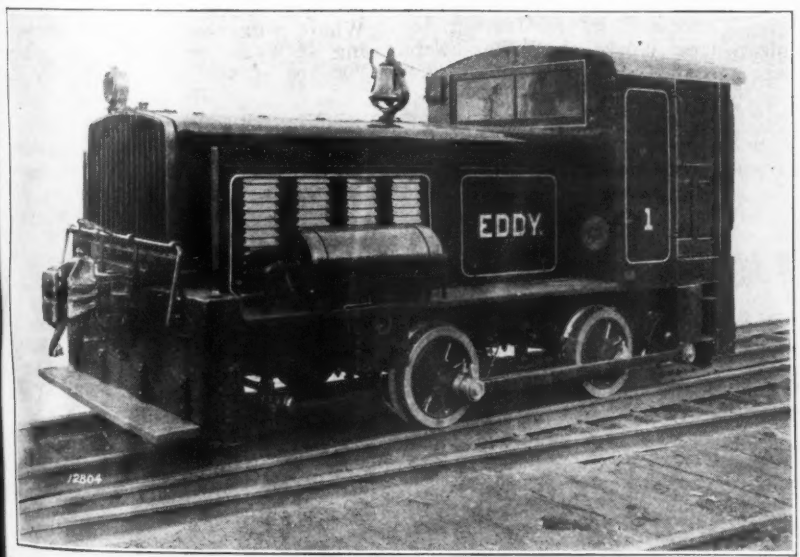
The annual dinner marked the high water mark in attendance and enthusiasm with a goodly measure of entertainment provided by some of the best cabaret artists in New York. Under the skillful guidance of Toastmaster E. D. Raymond, events followed thick and fast, intersperse with a fine talk and message of good will from D. Everett Waid. President American Institute of Architects. At the speakers' table were also Rudolph P. Miller, C. E. Chairman Building Officials Conference: L. H. Woolson. C. E.. for the National Board of Fire Underwriters; A. C. Streamer, Chairman, Panelboard and Switchboard Section Associated Manufacturers of Electrical Supplies: C. W. McCaulley, Vice-President Tile and Mantle Contractors Association Edwin L. Seabrook. Secretary, National Association Sheet Metal

New 13-ton Vulcan Gasoline Locomotive Equipped With Westinghouse Airbrake

ANNOUNCEMENT has just been made of another notable installation by the Vulcan Iron Works, Wilkes-Barre, Pa., the well-known builders of steam, gasoline and electric locomotives. This new addition to an already wide range of industrial track haulage units is a 13-ton gasoline locomotive, Standard Gauge built for one of the largest pulp and paper mills in the world, The E. B. Eddy Co., Hull, P. Q., Canada.

The locomotive has several new and interesting features, chief among them being the attachment of Westinghouse airbrake equipment, and this is probably the smallest locomotive ever to be equipped with this class of equipment. It was considered necessary, however, as a safety feature due to heavy grades that would have to be contended with and the slippery condition of the track during winter weather.

The equipment used is the Westinghouse type A. M. M., consisting of air compressor, gear driven from the engine shaft and provided with governor and automatic unloader. When pressure reaches a predetermined point the governor unseats the intake valves and when pressure drops the governor automatically cuts in the valves. The operator's valve is type "M-24" with type "A" bracket and "C-6" feed valve. The equipment is for both straight and automatic application, that is, for braking on both the locomotive and car wheels, and the valve used is so designed as to operate both with only one handle. Two main reservoirs of ample capacity are provided and located on each side of the locomotive. Auxiliary reservoir, triple valve and double check valve are conveniently located underneath the running boards in an accessible position for inspection and testing. The brake operating cylinder is located so that the piston packing can easily be replaced when worn. The air operating cylinder is interconnected with a separate brake lever in the cab, so that brakes can be applied by hand in case of air failure. Regulation air hose is provided both front and rear of locomotive for coupling to standard railroad cars, and the entire brake arrangement meets with the requirements of the I. C. C. Of particular interest is the fact that the airbrake apparatus can be instantly released from service, if



The New 13-Ton Vulcan Locomotive.

necessary, and the auxiliary hand brake used exclusively.

This 13-ton locomotive is equipped with spring draft rigging both front and rear. This feature is provided for the purpose of absorbing the shocks encountered in coupling to heavy standard gauge cars, thereby protecting the running gear and motor and assuring longer life for the locomotive. The cab is of Vulcan standard construction, made of steel and specially adapted to cold weather conditions. Cab has sliding doors at rear and left side and all windows are adjustable, affording comfort under all climatic conditions. A heater is also provided in the cab for use in cold weather.

The whole design and construction is typically Vulcan and steam locomotive practice is followed wherever possible. Frames are of open hearth cast steel, and wheels have cast iron centers with steel tires. Locomotive is equipped with a 110 H. P., six-cylinder, Climax engine and transmission is the Cotta constant-mesh type giving four speeds forward and four speeds reverse. The manufacturers' ratings for tractive forces and speeds are as follows:—2 m. p. h., 7,800 lbs.; 3.56 m. p. h., 6,500 lbs.; 5.9 m. p. h., 5,100 lbs.; 10.5 m. p. h.; 2,800 lbs.

This same design is built in 15, 20 and 25 ton sizes, and full particulars can be obtained by addressing the Vulcan Iron Works at Wilkes-Barre, Pa.

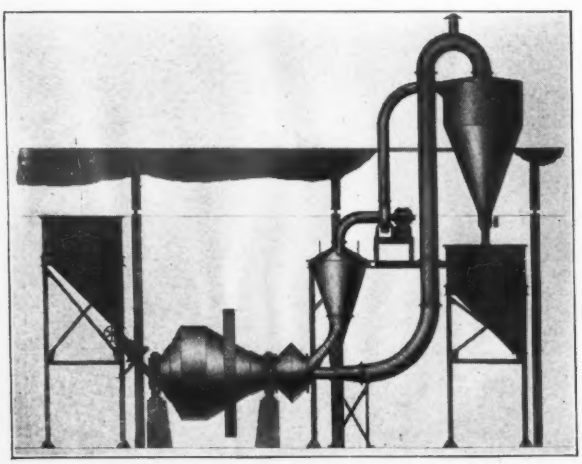
The Hardinge Air Classifier

SOME interesting work is being done with the new Hardinge Air Classifiers, which have been developed for use with the Hardinge Conical Mill. These Classifiers operate on an entirely new principle—that of reversed air currents. The same volume of air is used throughout the entire process of grinding and separating, the classification of fine from coarse material being secured by regulation of velocity in different sections of the classifier. The current first enters the mill, stires up the material, hastening its discharge, and at the same time, reduces any moisture content. As the material discharges, this current carries the fines directly to the finished product bin. Returning to the mill, at a higher velocity, it blows the coarse oversize back into the grinding zone. The prompt removal of fines results in a direct increase in efficiency of the grinding unit. The cost of power per ton of material ground is reduced and the capacity of the mill increased.

The accompanying drawing illustrates the simplicity of the layout. All auxiliary equipment is elimated. The operator supplies foundations and finished product bin. The manufacturer supplies the complete unit—mill, classifier, piping, fan. This layout shows the Rotary and Superfine Classifier, which will produce a product of any degree of fineness. Where a fineness of 98 per cent passing 48 mesh, or 80 per cent passing 200—or—coarser—is required, the Rotary Classifier is used.

These Classifiers have been operating on limestone ad shale for rock dusting, ceramic materials, coal for pulverized coal units, asbestos, sulphur, etc. Capacities range from 400 pounds to 35 tons an hour for the Rotary and 300 pounds to 20 tons an hour for the Superfine.

The Bureau of Standards has published a mimeographed circular entitled, "Inspection of Portland Cement." The paper was prepared by John R. Dwyer and Roy N. Young.



The Hardinge Air Classifier.

New Producers in East

Sand and Gravel Prices Advance. Crushed Stone Remains Uniform. New Stone Quarries Opened Up; 1924 Record Year.

By Our Eastern Correspondent

THE NEW YEAR has opened with bright prospects in the sand, gravel and crushed stone industries in the eastern districts. The trend to better business in other different standard lines is reflected keenly in the construction field, in which rock materials form such a basic part. The aspect is more encouraging than for many months past and the next twelve months are expected to show a large turn-over at good prices.

The advent of real winter at New York and vicinity, with heavy snows and freezing weather has brought the usual hardships and added costs to producers, but has developed, as well, a decided firmness in the market situation, resulting in advancing figures for several commodities, sand and gravel among them. Production has necessarily been curtailed in the different districts and there is a noticeable slack in the volume of stocks reaching the market. At the same time, producers are thoroughly alive to conditions and are ready to operate under even more stringent conditions, if necessary.

The year 1924 closed with a record-breaking building construction aggregate at Greater New York, totaling in round figures, $879,336,000, or more than $251,000,000 in excess of the previous year. Weekly contract awards in this section, including Northern New Jersey, range from $11,000,000 to $15,000,000, in valuation, and for the season this is decidedly good. Projected work now on the boards of architects and engineers indicate that 1925 will exceed the past year, and establish new high construction records, and producers are giving attention to plant facilities in anticipation of a heavy demand with the turn of spring.

Road construction will be an important consumption factor in the industry in the early months to come. In New Jersey contemplated work in 1925 will absorb an amount of $11,000,000, according to present calculations of the State Highway Commission; in Pennsylvania, it is purposed to raise a fund of $50,000,000, for road-building and improvements, or about twice the amount of work put forward in the year just closed, giving a total of about 1,000 miles of new highways in the next twelve months' period. Similar heavy road work is projected in New York and in the New England States during 1925, the gross figures for the eastern district ranging well into $100,000,000. Large quantities of concrete aggregates will be used for this work.

The labor situation looks highly favorable for the year ahead; the construction and affiliated industries are free from disputes and controversies at the present time, and equally free of anticipated dissensions of wage or operating character. The men are evidently satisfied with existing labor schedules, and it is not likely that employers will attempt any reduction in these figures until the supply of skilled mechanics increases. This is too far distant to estimate now.

The market situation at New York and vicinity continues satisfactory. Of all standard building commodities, brick is the only product to sustain a set-back, while others are forging ahead in price and demand. The present call for sand, gravel, crushed stone, cement, and kindred materials is substantial, and business during the past few weeks has gone to deplete the stocks on hand. Building supply dealers are active in the wholesale market, and are using good judgment in purchasing now, for there is every indication of advancing levels. Far-seeing construction interests, with forthcoming projects, are also placing orders for early future deliveries.

Best washed gravel shows another advance in price during the past month in the wholesale market at New York, now being quoted at $2.25 a cubic yard in cargo shipments, alongside dock, as compared with a previous level of $2.00, both 1½-in. and ¾-in. sizes. This is an increase of 50 cents a cubic yard in the past 90 days. The new figures shows strength and is expected to maintain until the spring season. Building supply yards are still quoting gravel at $2.90 a cubic yard, both sizes, delivered on the job, but are expected to advance this figure in accord with the new wholesale level at an early date.

As prophesied in recent issues of PIT AND QUARRY, sand has advanced in price effective with the New Year,

now being quoted at $1.25 a cubic yard in wholesale shipments, alongside dock, as against a previous level of $1.00. The present price is the same as that of a year ago at this time. There is decided firmness in the new figure and it will be maintained for several months to come. Building material dealers are quoting at $2.00 a cubic yard, retail, but will likely advance this level to $2.25 in the very near future; this branch of trade is quite active in the market at the present time.

Crushed stone remains uniform at $1.75 a cubic yard for 1½-in. stock, and $1.85 for ¾-in. material, carload shipments, wholesale. These figures are 10 cents per cubic yard higher, in each instance, as compared with quotations at this time a year ago. There is a fair, average call for stocks at the present writing. Delivered material from the building supply yards holds at $3,00 per cubic yard within established zones at New York.

Portland cement is operating under an encouraging call for this season of the year, and while there has been a little slack in orders as compared with weeks prior to the holidays, the situation is entirely satisfactory. There are no changes in quotations at New York and vicinity. Wholesale, alongside dock, without bags, a price of $2.15 a barrel is current, while delivered stock runs to $2.60 according to destination. In the retail market, dealers are asking $3.00 a barrel on the job, with standard 10-cent bag rebate. These prices have become quite well standardized for the present, and are expected to hold for a number of weeks. None of the mills in the eastern district have made any change in their base prices.

Common lime at New York, wholesale, is selling at $12.00 to $13.00 per ton, hydrate material, at the warehouse; while common lump lime is from $2.50 to $3.00 a barrel, wholesale quantities, at warehouse. Hydrate finishing lime is around $18.00 a ton, wholesale, in this market, while lump finishing stock is priced at $3.75 a barrel.

There have been no important changes during the past few weeks in price levels in the New England districts. Gravel holds at $1.50 per ton, wholesale lots, 1½ and 3¾-in. sizes; this is an increase of 10 cents per ton, in each instance, as compared with 1924 winter prices at Boston, and vicinity. Sand is being turned for wholesale account at $1.00 a ton, as against $1.10 at this time last year. Crushed stone is selling at $1.60 a ton at Boston, both 1½ and ¾-in. sizes, wholesale, in cargo lots. Portland cement continues at $2.68 in the Boston market, wholesale, less bags.

A new company has been formed at Dover, N. J., to operate limestone properties in this district. It will be known as the Hamburg Ridge Lime Co., capitalized at $100,000. The organization is headed by Eugene J. Cooper and William C. Spargo, both of Dover.

John S. Reiff, Lykens, Pa., former sheriff of this place, has formed the anthracite Crushed Rock Co., to operate a quarry and stone-crushing plant in this section. The new organization is capitalized at $10,000. S. H. and C. A. Hoff, both of Lykens, are also interested in the company, which purposes to perfect plans at an early date.

New Gilman Bulletins

Two new bulletins recently issued by the Gilman Manufacturing Company of East Boston, Mass., are of particular interest to all users of rock drilling machines.

Bulletin No. 103 covering the GILMAN Drill Steel Heat Treating Machine, say the manufacturers, "marks a decided innovation in the method of heat treating rock drill steel." As a result of searching study under practical working conditions the GILMAN Heat Treating Machine insures accuracy and uniformity "at a lower cost even than heretofore obtainable." In order to preserve the shape of a drill bit by proper heat treatment, day in and day out, automatically controlled mechanical means are required, for personal judgment cannot be relied upon.

Bulletin No. 101, on Mounted Rock Drills for Mine, Quarry and Contractor, describes the various types of GILMAN Rock Drills. "No one feature," they say by way of introduction, "is responsible for the outstanding GILMAN attainment. Rather, it is the use of sound and tried engineering principles, plus the development of original and ingenious features of design and an untiring effort to improve and refine every part; a combination that has resulted in the production of the most powerful, effective and economical rock drilling machines possible."

Climax Annual Sales Conference

ON SATURDAY and Sunday January 10 and 11, 1925 the Annual Sales Conference of the Climax Engineering Company was held in Clinton Iowa and was voted an unqualified success by everyone. They had nearly fifty visitors from out of town, coming from as far as Boston, San Francisco and many places in between, and including both customers and dealers.

Invitations were sent out early in November announcing the conference and the party was finally completed during the Road Show in Chicago. Two special Climax sleepers were attached to the Chicago and Northwestern train leaving Chicago at 12:15 Friday night, and dropped off at Clinton at 4 o'clock Saturday morning. The forty-eight passengers were allowed to sleep, however, until the Climaxers called for them with their automobiles at 7:30 and took them to the Hotel LaFayette for breakfast.

About nine o'clock the visitors and about sixteen Climaxers went to the Climax foundry at 12th Avenue and 5th Street where the pouring of the Saturday morning heat was witnessed. From there the party proceeded by auto to the main plant at 18th Avenue and 4th Street, and were conducted through all departments. Most of the visitors had never been there before and were agreeably surprised to see what a large and up-to-date institution Climax really is, and were very favorably impressed with the fine spirit of helpfulness by the entire organization.

At noon luncheon was served to the entire party of eighty in the main office, the fourteen Climax stenographers covering themselves with glory as waitresses. When you consider that they are not at all hard to look at you will realize what a hit they made. In fact, when they sat down to their luncheon, afterward, a half a dozen of the visitors insisted upon waiting upon them. And they did a good job too.

Beginning at about 2 o'clock Saturday afternoon a Sales and Technical Conference was held in the Climax office and the interest of all was manifest throughout the three hour session. The Climax President, G. W. Dulany, Jr., presided and carried through the following program according to schedule:—

1. Characteristics of Climax Engines by R. C. Rowan, General Manager.
   Discussion by H. H. Waters, Engineer Gasoline Engine Department.
2. Operation and Maintenance of Climax Engines by Lorimer Dunlevy, Works Manager.
   Demonstration of Cylinder Head and Gasket Mounting by Sherman Slocumb, Service Department.
3. Clutches, Power Take-Offs and Reduction Gears by P. H. Batton, Twin Disc Clutch Company.
4. Radiators and Cooling Systems by F. M. Young, Perfex Radiator Company.
5. The Sales Department and the Market by Edw. Crowley, General Sales Manager.
6. The Climax-Hindl-Diesel Engine by G. W. Cravens, Vice-President.
   Discussion by Norman McCarthy, Engineer Diesel Engine Department.
7. Climax Refrigerating Units by H. B. LaRue, Refrigeration Sales Department.
   Discussion by W. Wishart, Engineer Refrigeration Department.

Many questions were asked and answered and everyone considered the meeting as fully worth while.

At the conclusion of the afternoon session the visitors were taken to the Hotel LaFayette, where rooms had been provided for all for the night, so they could get ready for the Annual Banquet. This was held at the Wapsipinicon Club, Clinton, at 6:30 Saturday evening and the spirits of the crowd ran high until nearly midnight. Several of the Directors of Climax and other visitors were present, bringing the total to nearly ninety. During the course of the dinner music was supplied by a local boys' orchestra, and later a trio from one of the theaters sang several songs which were highly appreciated.

Mr. Dulany acted as toastmaster for the evening and covered himself and Climax with glory, as usual. He proved a most general host and was so voted by all. The large bowl of fruit punch on one of the side tables needed frequent refilling and was not the least of the attractions of the evening. Short talks on their respective businesses and their relation to Cli-

max were given during the evening by the following visitors:—

F. B. Carter, Fate-Root-Heath Company, Plymouth, Ohio; G. R. Conyne, Keystone Driller Company, Beaver Falls, Pa.; G. B. Curd, Geo. B. Curd Equipment Company, Cincinnati, Ohio; W. F. Harrison, Jr., Beckwith Machinery Company, Cleveland, Ohio; W. N. Keiser, The Parsons Company, Newton, Iowa; N. McNeilly, Beckwith Machinery Company, Pittsburgh, Pa.; V. A. Van Horn, Four-Drive Tractor Company, Big Rapids, Mich.; A. F. Yeaton, Star Drilling Machinery Company, Akron, Ohio; H. W. Seaman, City National Bank, Clinton, Iowa.

As each of the foregoing speakers and other prominent guests were introduced they were welcomed by a burst of impromptu song by a bunch of wild Indians seated around the table in the center of the room. It will be admitted, however, that the high pressure poetical composition was good and well received. The entire crowd also joined in singing the Iowa Corn Song several times during the evening.

Twice during the speech making the program was interrupted in order to confer "honors" upon certain members of the party. W. F. Harrison decorated George B. Curd with numerous and sundry medals, badges and ribbons for his undoubted and well-known accomplishments along various lines we need not mention publicly, and G. B. responded in his usual gracious way.

Then Mr. Dulany "George" initiated George Conyne, George Curd and George Davisson as members of the "Society for the Prevention of Calling Sleeping Car Porters George." "Dulany" originated this society about five years ago, and it now has nearly 12,000 members. This is the S. P. C. S. P. G. mentioned by George Ade in his article on naming boys in Hearst's International Magazine for November, 1924. Most of the prominent Georges in the world, living and dead, are members, and all others are cordially invited to join. There are no dues to pay.

After the banquet the party adjourned to the parlors of the Wapsie Club and played billiards, read magazines or talked shop awhile and then returned to Hotel LaFayette for the night. Some of the weary pilgrims apparently found good beds for most of them were rather late for breakfast Sunday morning.

The program for Sunday covered personal conferences with members of the Climax staff on various matters of special interest, followed by auto trips around Clinton. The visitors agreed that Clinton was a fine town and seemed reluctant to leave, but most of them returned to Chicago on the noon train.

By Sunday night the conference was a matter of long to be remembered history, and all who attended said they would look forward to next year's meeting with pleasant expectation. Those who were unable to come surely missed a good conference, and the Climax Engineering Company hope to have at least twice as many present next year.

Republic Appoints New Distributors

Official announcement is made by the Republic Motor Truck Co., Inc., Alma, Michigan, of the appointment of the Hoffmaster-Gifford Motor Co., 65 Essex Street, Youngstown, and Republic Sales and Service, 11 North Wilkinson Street, Dayton, Ohio, as distributors for Republic trucks in their respective cities and surrounding territory.

Spacious salesrooms and well equipped service stations are maintained by both distributors, together with a complete stock of genuine Republic parts for all models.

Furthermore, the new distributors maintain a staff of experienced mechanics trained especially to know and understand the mechanical features of Republic trucks. In this way, every owner is assured really intelligent service so that his truck, or fleet of trucks, may be kept in continuous operation.

The Republic truck company is now manufacturing the most complete line of trucks in its history and has a model to offer for every haulage need. Important improvements and refinements have been made in design and construction.

Barber-Greene Change

Mr. George L. Sawyer, who has been with the Barber-Greene Company, manufacturers of loading and conveying machinery, of Aurora, Illinois, for the last five years and who has been their representative in New York, has severed his connection with that company. Mr. S. D. Brown succeeds Mr. Sawyer in charge of the New York office at 141 Centre street.

The New Buda Industrial Engine

THE new model industrial engine brought out by the Buda Company this year is Model JVU, 5¾x7⅛ inches, four cylinder, having a piston displacement of 749 cubic inches.

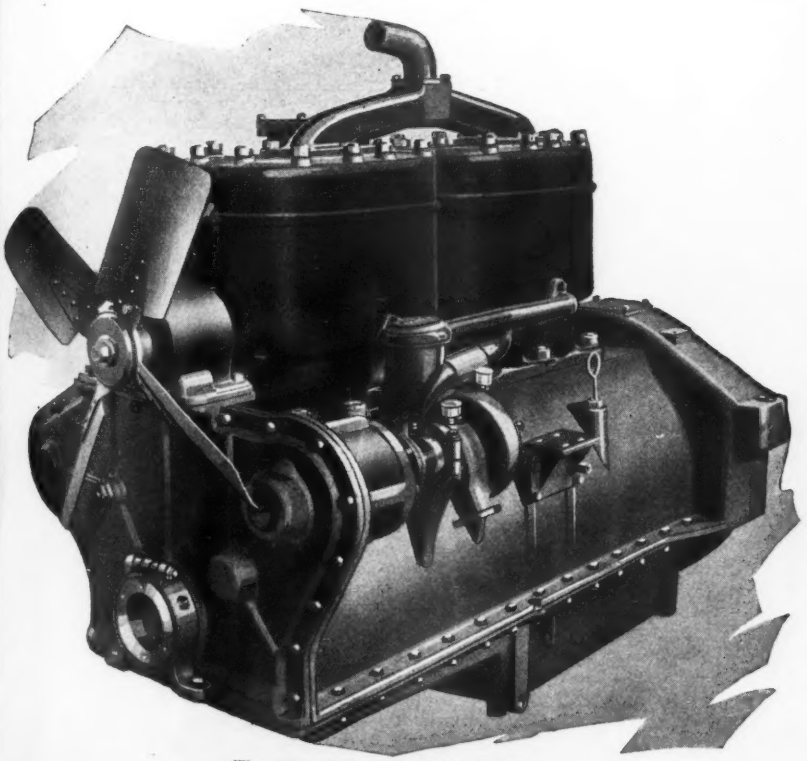
This engine is intended for operating industrial machinery where a heavy duty reliable engine is required. This engine develops approximately 50 B.H.P. at 600 R.P.M. and 83 B.H.P. at 1000 R.P.M.

In the design of this engine, many of the features which have proven so advantageous in other models of Buda engines remain, although a few changes have been made to take care of the conditions which prevail in the larger engine. The cylinder blocks are cast in pairs to facilitate handling. The crank case is made of grey iron and is of deep section, making the engine very rigid. This crank case is equipped with large handle plates on the carburetor side for inspection or adjustment purposes.

The intake and exhaust manifold design is the same as is used on the smaller models of Buda engines, being of special heating type which has proven so successful in taking care of the lower grades of gasoline that are in the market today. Due to the highly developed manifolding of this engine, no hot air stove is necessary and dry gas enters the cylinders at a lower temperature than is encountered with other types of engines. This results in a higher volumetric efficiency which of course means more power.

The exhaust manifold has the vertical center outlet which makes a very convenient connection for industrial purposes, as the exhaust may be carried off vertically from the center.

This engine may be furnished either with a geared fan or with a belt driven fan, whichever is desired.



The New Buda Industrial Engine.

This engine is also laid out with the idea of taking full power from the front end of the crank shaft if an installation requires power to be taken from this end.

The oiling system is of the same type of force feed lubrication which has proven out so well in other models of Buda engines. Gear type of oil pump is driven from the cam shaft and forces the oil through seamless steel tubing which is cast in the crank case. Passages leading from this oil line to the main cam shaft and rod bearings are drilled. The connecting rods are forged with a rib in the center through which is drilled an oil passage leading to the floating wrist pin, thus all of the working parts of this engine are under forced lubrication and there are no threaded oil connections in any part of the motor to leak or work loose.

One new feature in this engine is the oil draining valve, the handle of which is brought up the side of the crank case to a convenient location to water pump. To drain this engine, it is not necessary to get underneath and remove the plug from the drain, but it may be taken care of by turning the lever at the side of the crank case. This lever is supplied with a snap lock so that there will not be any chance of turning it accidentally.

This engine, like other Buda models, is equipped with flange mounted for two-unit electric generator and starter system. These mountings are according to S.A.E. standards and if generators are required, a twelve-volt system can be supplied.

As this engine is designed primarily for industrial purposes, such as cranes, hoists, air compressors, shovels, pumps and many other types of equipment, the flywheel is arranged to take the Twin Disc power-take-off which is recommended for this model.

Before this engine was designed, a very careful study of the operating conditions was made and the design was made to meet these conditions. The crank shaft and bearings are exceptionally large, shaft being 3 inches in diameter and the connecting rod bearings are also 3 inches in diameter. This engine is fitted with number 1 S.A.E. bell housing.

As this engine is built for industrial purposes, it may be furnished either in the bare condition as shown in illustration, or it may be furnished with operating equipment such as magneto, with impulse starter coupling, carburetor, governor, clutch, power take-off, radiator, and in fact it may be furnished as a complete power unit with sheet metal and steel base if desired.

Vertical and Angle Worm Gear Reducers

THAT there has been a need for a vertical reducer drive is attested to by the fact that many make-shifts—to some good reducers—have been made to meet this demand.

Vertical drives for agitators, mixers, dryers, screw conveyors, and other machinery need vertical reducers—and to meet this demand the D. O. James Manufacturing Company, manufacturers of speed reducers since 1904, has designed a complete line of worm gear reducers.

James Vertical and Angle Reducers are not an experiment, however, but date back to the first installation in 1914. This type of reducer is small and compact, noiseless and powerful, and allows for the motor to be placed at a distance away from the drive itself, eliminating danger of spoiling the armature windings due to vapors, gas, or steam arising from the tanks or tugs over which they operate.

The Angle Type Worm Gear Reducer is made to meet the demand for a small compact unit that can be tucked away in the corner or for driving a slow-moving belt conveyor where the drive is placed alongside the conveyor instead of extending out into the room and taking up valuable space.

One of the many features of James Vertical and Angle Worm Gear Reducers is the thrust bearing construction. All shafts are held in rigid alignment by thrust bearings so designed as to absorb all the thrust load without allowing the shafts to misalign themselves.

The James type of Vertical and Angle Reducers cost a little more than make-shift gear assemblies, but they have so many advantages that they pay for themselves in a short time. They are uneffected by heat, cold, moisture, abrasive dust, acid, gas, or steam. They make for better safety because they are entirely closed and require no care or attention except occasional oiling.